



FRIDAY, FEBRUARY 13, 1880.

American Society of Civil Engineers—Papers and Discussions.

Under date of Jan. 31, 1880, Secretary John Bogart has issued the following:

The following papers and discussions are in type, and will soon be printed. Dates for the discussion of each will be announced for time to time. Discussion on the subjects of each of these papers is especially invited. The Secretary will forward advance sheets of either paper to those members who inform him of their desire or intention to take part in the discussions. Members unable to attend the meetings of the Society, are requested to forward their discussions to the Secretary, who will present them for the authors.

Interoceanic Canal Problems; discussions by J. W. Adams, N. Appleton, John C. Campbell, O. Chanute, W. W. Evans, J. M. Goodwin, F. M. Kelley, T. J. Long, E. P. North, Max E. Schmidt, S. F. Shelbourne, C. A. Sweet, C. D. Ward, Ashbel Welch, A. G. Menocal.

Engineering Problems Involved in the Proposed Improvements of the Erie Canal, by Increasing the Depth of its Channel One Foot; by E. Sweet, Jr.

Note on Kutter's Diagram; by Charles H. Swan.

The New York & Brooklyn Bridge Approaches and Superstructure; by F. Collingwood.

Experiments with Apparatus for Testing Cements; by Alfred Noble; with discussion on testing cement, by F. Collingwood, D. W. Cunningham, C. Latimer, F. O. Norton, F. Riencker, W. Sooy Smith, D. J. Whittemore.

Design and Construction Table for Egg-Shaped Sewers; by C. G. Force.

Cushioning the Reciprocating Parts of Steam Engines; discussion by C. E. Emery, John W. Hill.

The Flexure and Transverse Resistance of Beams; discussions by DeV. Wood, William Kent, C. S. Emery.

The Fall of the Arch Approach to the South Street Bridge, Philadelphia; discussion by J. G. Barnard, F. Collingwood, G. W. Dresser.

Relative Quantities of Material in Bridges of Different Kinds of Various Heights; discussion by Charles E. Emery.

Brick Arches for Large Sewers; discussion by C. Herschel, R. Hering.

The Preservation of Timber, by J. W. Putnam; discussion by E. R. Andrews.

Enlargement of American Steel Works.

Under date of Jan. 24, Mr. A. L. Holley writes as follows to Mr. Swank, Secretary of the American Iron and Steel Association:

In reply to your letter of the 23d instant, I give you, very gladly, all the facts I have concerning the enlargement of our steel works.

First, in regard to Bessemer steel works: The Albany & Rensselaer Iron and Steel Works have lately increased the capacity of their vessels and blowing engines, which should add 12 or 15 per cent. to their ingot output. They have nearly completed a heavier blooming train, 31½ inches, to replace the old one, and also are adding a 10-inch, a 14-inch, and an 18-inch train. The Bethlehem Iron Company is just completing an additional converting plant, which will more than double its ingot capacity. It is completing a 24-inch steel train, and is building a heavier engine for its 21-inch merchant-steel train, which will increase its capacity. The Pennsylvania Steel Company is about completing a three-vessel Bessemer plant, which will more than double its ingot capacity. The Cambria Iron Company is about enlarging its vessels, so as to add 10 or 12 per cent. to its ingot capacity. It is also getting out drawings for a new rail-mill, to be completed as soon as possible. It is building another 20-foot blast furnace for Bessemer pig. The Edgar Thomson Steel Company is just now enlarging its vessels and adding a cupola, which should increase its ingot output 10 or 15 per cent. The Joliet Steel Company is about putting in new cupolas, vessels, and other Bessemer apparatus, also a spare hydraulic engine and a spare blowing engine, which should add 20 per cent. to its ingot capacity. The Vulcan Steel Company, after standing idle a year or more, is just blowing in, after extensive repairs, which should add at least 100,000 tons to the ingot capacity of the United States. I do not know what, if any, additions are going on at Scranton, Cleveland, South Chicago (Union), or North Chicago. I believe Scranton is about to double its ingot capacity by erecting a second Bessemer plant.

Second, in regard to open-hearth steel works: The Cambria Iron Company has lately started a pair of 15-ton Pernot furnaces, but the plant is still incomplete. When the Krupp washer, now building, is in operation, the ingot capacity will be at least 40,000 tons per year. Two similar furnaces are contemplated, to be begun when these are got into full work. The Bethlehem Iron Company has nearly completed a pair of 12-ton open-hearth furnaces, which, with the Krupp washer, or with the Siemens direct process contemplated for preparing the material, will give an ingot capacity of about 30,000 tons per year. The Pennsylvania Steel Company is, I believe, going to increase its open-hearth capacity. The Springfield Iron Company, of Illinois, is about to start one 15-ton Pernot open-hearth furnace, and is building a second and a Krupp washer, which will give 40,000 tons ingot capacity, intended chiefly for rails. This plant will be followed by another, like it or larger, when the first is well started. The Nashua Iron and Steel Company is about adding a second 12-ton to 15-ton open-hearth furnace. The Otis Iron and Steel Company is adding a fourth 12-ton open-hearth furnace. Spang, Chalfant & Co., Pittsburgh, have commenced building a pair of 10-ton Pernot open-hearth furnaces and a Krupp washer, also a blooming train and other trains to make and work up 25,000 to 30,000 tons of steel per year. Park, Bro. & Co. are about starting a 10-ton opening-hearth furnace. The Albany & Rensselaer Iron and Steel Company, the Joliet Steel Company, and the North Chicago Rolling Mill Company intend I believe, to erect open-hearth works.

Third, the open-hearth works started during the past eighteen months are B. Atha & Co., Newark, New Jersey, one furnace; A. Klonan, Pittsburgh, one furnace; Hussey, Howe & Co., Pittsburgh, one furnace; Shoenberger & Co., Pittsburgh, one furnace; Anderson & Co., Pittsburgh, one furnace; Otis Iron & Steel Company, Cleveland, one furnace; Mitchell, Tranter & Co., Covington, Ky., one furnace; Burgess Iron & Steel Company, Portsmouth, Ohio, one furnace. During that time the St. Albans

Iron & Steel Company, Vt., has restarted its furnace, and the Roane Iron Company has got its two in regular operation.

Fourth, the Pittsburgh Bessemer Steel Company, Limited, is erecting a Bessemer plant of about 75,000 tons ingot capacity. I hear rumors of other Bessemer works in contemplation, but I can not make any authoritative statement.

Railroad Signals.

[From the eleventh annual report of the Massachusetts Railroad Commissioners.]

Resolve in Relation to the Use of Signals on Railroads.

Resolved, That the Board of Railroad Commissioners be instructed to investigate the subject of railroad signals, and to report the result of their investigation to the several railroad corporations in this commonwealth, and to the next General Court. (Resolves, 1879, chap. 24.)

In conformity with this resolve, the board gave extensive notice of public hearings, and have examined many models, and a greater number of working signals, on the railroads of this and other states. The great importance of the subject, and the attention given to it by railroad managers, together with its relation to other matters now under consideration, have induced the board to place their views in the body of the report.

BLOCK AND INTERLOCKING SYSTEM.

There can be no doubt that, for security from rear collisions, and from accidents occurring by reason of misplaced switches, or open draw-bridges, the block system carried out by interlocking switches and signals, comes nearer to insuring immunity from accident than any other known device. The block system, long used in England, and now brought almost to perfection by interlocking devices, is so called because under it each section of road is "blocked" by signals against the entrance of a train while that section is occupied by another train. Improving on the former system, which only provided for an interval of time between successive trains, the block system secured an interval of space. Under it a railroad was divided into telegraphic sections. Before a train could start from the first station, a signal was sent from the first to the second, and a favorable reply was received; then a signal was made for the train to leave station one, and, at the same time, station two was notified of the fact; this notification was acknowledged, and the section was "blocked" by a signal showing that it was occupied. When the train reached station two, a signal was sent to station one that the line was clear, and the "block" was taken off. Of course, if the train met with an accident, or if it was delayed in reaching the second station, the section continued to be blocked, and no other train entered it until a signal from the second station gave notice that the danger had ceased. And the same precautions guarded every section throughout the line.

THE INTERLOCKING OF SWITCHES AND SIGNALS.

combined with the block system, not only secures each section from the entrance of a train while it is already occupied, but also blocks the section for any train while the track is broken by the throwing of a switch, or by the opening of a draw-bridge, thus removing these causes of numerous disasters, while it allows a vast increase in the number of trains.

The method, in brief, is by the use of levers operating switches and signals, so interlocked that a signal of safety cannot be given while danger exists, and danger cannot exist until after it has been signaled. In other words, the operator cannot, by negligence or forgetfulness, or even from malice, create a danger, or suffer it to exist, until he has signaled it afar off to any approaching train. He cannot open a switch before setting a signal at danger; having opened a switch, he cannot leave a signal at safety; he cannot set the signal at safety before closing the switch; he cannot leave the switch half closed without giving a signal of danger. All these four errors, each of which has cost many lives, are made impossible in a section of road guarded by this system. And the boast is not extravagant that, for this purpose, the working of signals is not trusted to the intelligence or to the fidelity of a man, but that each man becomes part of an unerring machine, in which his will ceases to operate, and he must act in accordance with the principles of its mechanism.

Mr. Barry, in his work on railway appliances, gives a strong illustration of the perfection to which mechanical provisions for safety have been carried. At Cannon street station, in London, 70 switch and signal levers are placed in one signal house, making millions of combinations possible, if they were not interlocked. Of these combinations only 808 are safe. Yet a stranger, blindfolded or blind, handling these levers at random, cannot produce a condition of danger. He could stop trains and hinder business, but he could not create a possibility of danger without signaling it in advance.

More than this—because the pulling of the wrong levers, although not causing immediate accidents, does strain the machine, and thus might lead to the unlocking of the levers, with consequent disaster; therefore, the attempt and bare idea of pulling the wrong lever is checked by mechanical means, and the uncertain will of man is subordinated to the perfect mechanism of this device.

In operating this apparatus two systems of signals are used, one near the cabin or tower of the operator, and one at a distance sufficient to enable a train to be stopped after the signal is seen, and before entering on the blocked section. The semaphore is used by day for a signal, as being the one distinguishable at a greater distance than any other form. At night colored lights are used. Mechanical means may be employed for short distances; electricity serves for long distances. To supplement the signal, if it should be obscured by fog or darkness, a "contact bar" is sometimes used, which, with the danger signal, assumes a horizontal position, and, by striking the cab of the locomotive, gives a warning somewhat like that given by the bridge-guards, which strike the person who is exposed on a freight car.

The working of this system for draw-bridges is the same as for switches. The draw cannot be opened until the signal for danger has been set. The signal of safety cannot be given until the draw has been closed and actually locked.

By uniting the interlocking device with the block system, it becomes impossible to telegraph safety from one signal station to the station next in the rear, until all the switches are in a safe position for a coming train. It is impossible to move switches so as to allow access from a siding to a track which has been telegraphed as safe for a coming train. It is impossible to so move the switches, or any of them, after the line has been telegraphed to be blocked. It is impossible for a train to enter a section until its coming has been announced by telegraph, for the signal to enter cannot be given until a signal announcing its approach has been received. The signal which permits entrance into a section cannot be given without the concurrence of signal-men at both ends of the section. The starting signal is reset at danger by machinery behind every

train. The signal that the line is blocked must be given from the station in advance to the station in the rear.

This summary, in substance, is borrowed from a description of the combination of the Toucey and Buchanan with the Saxby and Farmer devices, which, aided by some subsidiary inventions, are now in use on a portion of the Pennsylvania Railroad and on the Metropolitan Elevated Railroad in New York, as well as elsewhere.

The ingenious device of David Rousseau, involving the same principles and accomplishing the same end, may be seen at the New York Grand Central depot. The members of the board have seen the operation of these inventions at these points, and their daily working vindicates the high claim made on their behalf. It will be a happy day for travelers when this system, in all its completeness, has been universally adopted on American railroads.

But the block system, as operated with interlocking devices in England and France, and as used with additional improvements on portions of American roads, requires a large body of skilled and well-paid men. For an unskilled operator, although he could not cause danger, would cause delay and difficulty. Our inventors, therefore, have tried to supply its place by automatic signals, guarding a road and giving warning of danger without the constant intervention of man. And it is claimed by some of them that their inventions are not only more economical than the English system, but that they are safer. In the language of one of these inventors: "My device is better than a man, for it is always on hand; it never sleeps and it never drinks."

As a preliminary remark to a discussion of automatic signals, it may be observed that it is a requisite of any system that the normal condition of its signals should indicate danger, so that, in case of any derangement of apparatus, accidental or intentional, warning will be given. Thus failure to act will at most stop or check the movement of a train. It will never cause a disaster. A device that fails in this particular fails at the outset. It is also absolutely requisite that the danger signal should be given far in advance of the point of danger. A signal displayed at or near the point of danger is utterly insufficient and unsatisfactory.

HALL'S ELECTRIC SIGNAL.

is the best known and most widely used. He employs an open circuit; and the current which keeps his signals set at safety is transmitted over wires. This current, being broken by an engine entering a section and touching a circuit closer, sets the signal at danger.

1. As a safeguard from rear collisions, theoretically at least, it approaches perfection. The danger signals are set a mile or less apart, and a red disk shows that a section is occupied. A secondary signal, sometimes called a tell-tale, is placed a thousand feet in advance of the danger signal, and informs the engineer whether the danger signal behind him has been set. When the engine passes out of a section, it sets the signal of safety for that section. If the current ceases to work from any cause, a signal of danger will be given. But absolute perfection has not yet been obtained in the construction of the apparatus; and the passage of a train sometimes fails to set the signal of danger; yet, in that case, the tell-tale will indicate danger. And so it cannot happen that both signals belonging to a pair will indicate safety when danger ought to be announced.

2. Station agents, by a separate device, can arrest the progress of a train at a distance of half a mile by a signal of danger.

3. The connection of switches with this system makes it impossible to open a switch so connected without blocking the track by a signal. This occurs at a distance of two thousand feet, more or less; and at the same time a bell rings at the switch, and continues to ring until the switch is closed.

4. The application of this system to drawbridges appears to secure perfect safety. It is impossible to open a draw-bridge without blocking the track by a distant signal; and, if the engineer fails to see, or recklessly disregards the blocking signal, then another signal will arrest his progress—a mechanical drop, constructed of heavy plank, placed 2,000 feet from the draw, and so arranged that it falls by gravity when the draw is opened; and, if the engineer still presses on, his locomotive is sure to lose its smoke-stack, and he yet has time to check his train and escape disaster. The working of this device was curiously illustrated when it was first used on a road in New York; for the train-men, having a prejudice against it, as a novelty, determined to disregard it; and more than one engineer bringing in his locomotive without a smoke-stack gave the best evidence of his own recklessness, and of the merits of the invention. Now that draw is opened 130 times a day, and it is approached without fear of accident. Two other adjuncts furnish additional safe-guards in approaching a draw-bridge guarded by Hall's signals—a bell ringing at the distance of a mile when the drawbridge is opened, and a signal given to the bridge-tender if the train enters the blocked section.

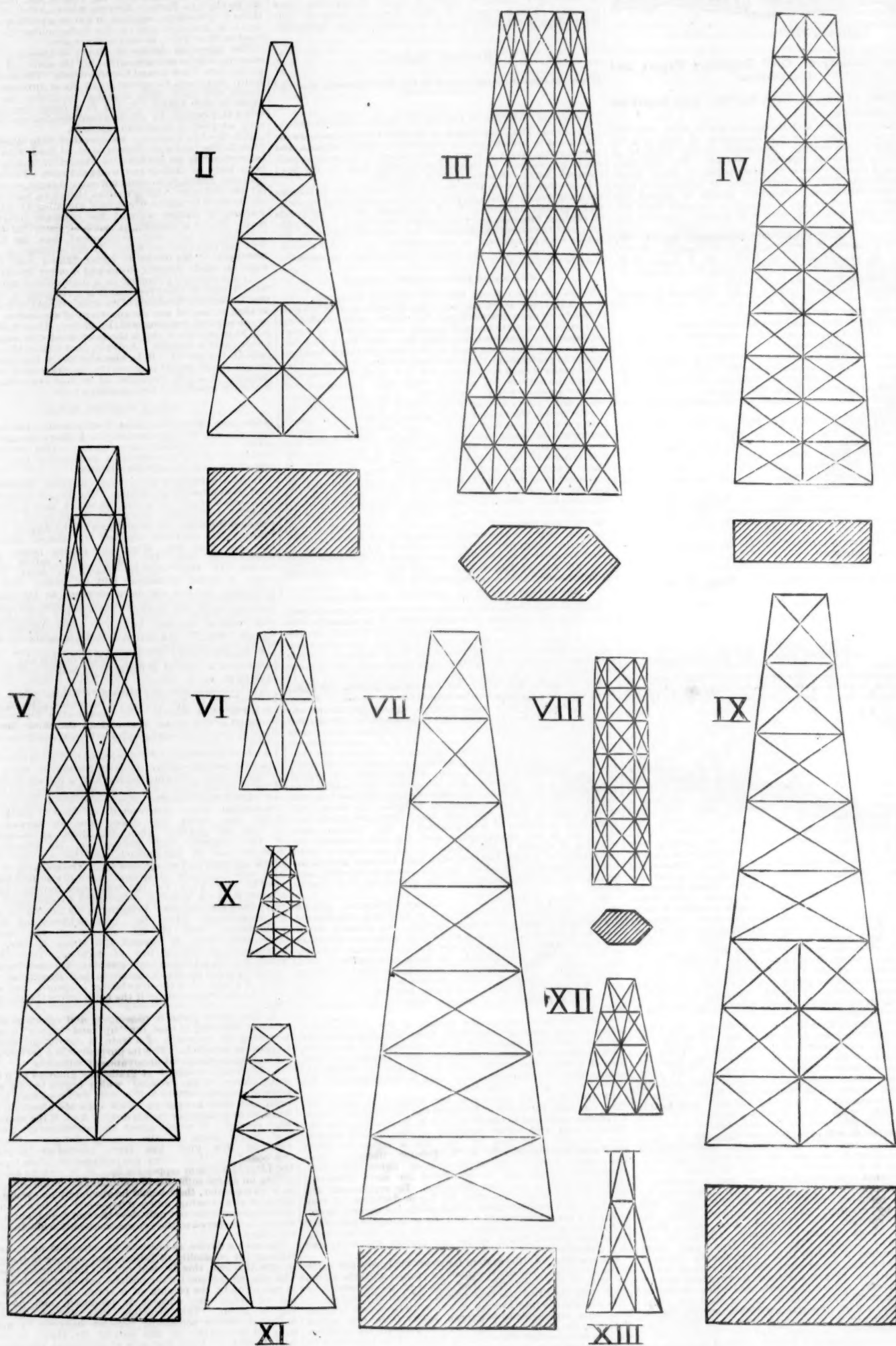
5. The notice given to passengers and agents at stations, by bells differing in tone for "up" and "down" trains, announcing the approach of a train, is convenient, and tends to prevent accidents. For its purpose it is a perfect device, while it saves the great annoyance of whistling.

6. Highway crossings at grade are guarded by a bell or gong, placed at the crossing, which begins to ring when a train approaches within half a mile, and continues to sound until the train has passed. This calls the attention of the flagman or gatekeeper to his duty. And, if the sound were loud enough, it would arrest the attention of travelers, and warn them of the coming danger. Some device of this kind has been heretofore urged by this board, and their views are repeated in their report on the Lincoln accident (appendix E). With such an appliance, giving an alarm sufficient to command attention and always in working order, there would be absolutely no excuse for an accident at a crossing, unless it happened to be a man blind as well as deaf; for not only does the bell sound, but a signal to stop is displayed to the eye automatically while the danger continues.

But such a device, in order to be depended upon, must be without the possibility of failure, and neither in theory nor in practice can this be said of Mr. Hall's crossing-signal. The ringing is done by the positive action of electricity put in operation by the passing of a train. If the apparatus is out of order, no current is produced, and no warning is given. The principle that danger should be indicated, unless something positive happens to prevent it, is not carried out in this part of Mr. Hall's invention. And, in fact, we learn that such an apparatus, placed within the limits of Boston, does occasionally fail to announce a coming train. Its use, therefore, is only auxiliary, and it will not, as it now exists, allow railroad managers to dispense with other safe-guards at highway crossings.

The objections urged against Mr. Hall's block or track and switch signals, apart from their cost, are mainly these:

(1.) It is said that they are so delicate and complicated that they often fail. This, to be sure, when the failure is of electric current, does not directly result in an accident. It only delays a train. Each double-track road has orders directing the time of delay on seeing the signal of



DIAGRAMS OF BRIDGE PIERS.

danger; a time necessarily brief—say one minute—and after this the train proceeds "with caution." But the tendency of frequent false alarms is to reduce the amount of caution; and the cry of "wolf," too often repeated, may make it unavailing when danger really comes.

(2.) It gives no warning of a broken rail, and does not profess to give such warning.

(3.) Neither does it give warning of a car left on the track by a passing train—an accident not unusual, especially with freight trains. On the contrary, in such a case, the engine, with the portion of a train attached to it, passing off from the obstructed section, sets the signal of safety and lures a coming train into danger by a false announcement. Something like this happened recently on one of our Massachusetts roads. An engine was sent after dark to take five cars from a siding, push them on the main track and then haul them away. There proved to be six cars, which were pushed from the siding, and when the five were hauled away, one uncoupled car remained on the main track. A passenger train afterward left the station and came in collision with this car. Fortunately, the result was not serious, but it illustrates a danger against which Mr. Hall's signals do not profess to guard.

(4.) So it is said that a train on a guarded section, followed by another train proceeding with caution, would, on passing off, set the signal of safety. The second train breaking down from some defect of wheel or like cause, would remain as an obstacle and possible cause of collision with a third train coming on the section with the assurance of a clear track given by the signal. This, however, could never occur unless the second train were allowed to enter a blocked section, nor without gross carelessness on the part of those in charge of that train in neglecting to flag the section.

THE UNION ELECTRIC SIGNAL.

hitherto little tried in actual working, professes to do away with all these objections, and to guard against all the dangers which Mr. Hall leaves unguarded. Its fundamental difference from his system is that it uses a closed circuit, with an electric current moving through the rails; and this current holds the signal at safety, from which it is moved to danger by mechanical means, whenever the current is checked, whether by the dangers intended to be guarded against, or by some accident to the apparatus. Thus, in all its operations (as in most of Mr. Hall's), a failure to work gives warning of danger, but no failure can entice a train into peril. The circuit through the rails is made more effective by wires connecting each rail with the next, and firmly fastened at every joint. This was found necessary because the oxidation of the rails interrupted their conducting power. Each section insulated by the use of vulcanized fibre. This seems to be effectual. The mechanical means by which the signal is given, in case of a broken current, is a simple clock-weight, so arranged that it runs for several days, giving passage for 600 trains before it runs down. The current is produced by a battery, and, in cold weather, a kerosene lamp, burning for a week at a time, is used to keep the liquid from freezing.

When a section of road is guarded by this device, the entrance of a locomotive breaks the current, simply by placing its wheels upon the conducting rails, and thereupon visible signals of danger are given, and when the train approaches a station or crossing a warning bell is rung. So excellent is its working, that a piece of wire laid across the rails breaks the current and sets the signal of danger, and a stray goat, dragging his chain after him across the track of the Providence Railroad, recently gave the alarm as of a coming train to the gateman at Forest Hill crossing. A secondary, or tell-tale signal, in this system, informs the engineer at once whether or not his train has given warning. And station agents have the means of warning a train that is entering on a blocked track. This device is considerably cheaper than Mr. Hall's, and it is claimed that, being simpler, it is less likely to be out of order. But it certainly has these more important advantages:

(1.) As a crossing signal it indicates danger in case of any accident to the apparatus. The failure of a battery, the breaking of the apparatus by accident or design, would of itself give an alarm, while in such case, as has been said, the Hall device would cease to work and trains would pass without warning. It is claimed, also, that it has this incidental advantage: Under it the bell is sounded by mechanical means, which are released by breaking the electrical current. And so the ringing may be done more powerfully than when it is effected by the direct power of electricity, which is variable, and which, as practically used, is supposed to be feeble than the cheap mechanical power applied by clock motion. But the soundness of this claim has not been demonstrated by any exhibition made to this board. And no crossing signal of this system has yet been exhibited which seems calculated to arrest the traveler's attention as thoroughly and certainly as it should.

(2.) The breaking or displacement of a rail, by interrupting the current of electricity, gives a signal of danger, provided the displacement of the portions of the rail is sufficient to cause such interruption.

(3.) It indicates the presence of a car on the track by whatever means it came there.

The invention has not been used nearly as much as Mr. Hall's. Its proprietors, therefore, cannot refer to so many witnesses as to its working. Probably it is just to add that, for the same reason, there may have been fewer criticisms on its defects. As has been suggested before, there seems to be this advantage in using a closed circuit, that it requires less from electricity. The labor of this system is done by gravitation, and electric force is only used to control it. Electricians are accustomed to say: "The less you ask of electricity the more sure you are to get what you want." In the present state of science, this is no doubt true.

Among the possibilities of failure with this signal, is neglect to wind up the weight, which would prevent any signal from being given. Some, also, object to the need of lighted lamps in cold weather; but failure of a lamp, resulting in the failure of a battery, would set a signal of danger. On one road, where a few of these signals are used, frequent breaking of the wires is complained of as giving needless signals of danger. The Fitchburg Railroad Company has had the signal on five miles of its road for more than a year, including the whole of last winter. Since May it has been in charge of the officials of the road, and their report is highly favorable. If it works well through the winter, it will have had that full and continued testing which such inventions need before can be commended with entire confidence.

ROUSSEAU'S SAFETY RAILWAY SIGNAL.

This signal has already been referred to as used in blocking the New York Central & Hudson River, where it has been in successful operation for nearly four years. It resembles Hall's system in many points—among others, in using an open circuit. It resembles the Union electric signal in using gravitation as the power which actually gives the signals, thus requiring a less powerful battery than the devices where electricity does the direct work. The signal is set by a clock-weight, and, when wound up, it signals 350 trains before it needs winding again. By an ingenious device, the lamp on these signals cannot be removed for trimming without winding up the weight.

As in the inventions described before, the engine, when it enters a section, sets the signal at red, meaning danger, and it so continues till the train has passed off, when it sets it at clear, meaning safety. Each of these effects is produced by a "commutator," over which the wheels pass. In places of extra hazard, two danger signals are used—one, called a distance or cautionary signal, 1,000 feet in advance of the signal within the section that is to be entered. If this distance-signal shows green (or any color selected for the purpose) it indicates that the second signal is red, and the engineer must stop before entering on that blocked section. This system also provides each station-master with the means of stopping any approaching train, if danger has been shown to exist; and an indicator keeps him acquainted with every movement on his section of the road. An extra signal, to be used in foggy weather or in dark tunnels is a rod, which not only strikes the engine, but, by an additional device, causes the whistle to sound; and, it is said, it can be applied to the brake and made to stop the train. The long use of this signal in the Harlem tunnel is relied on as proof of its excellence. The application of the system to switches and draw-bridges needs no explanation; and the application of all these systems to a single track, while it presents points of difficulty, is a matter of detail which need not be discussed.

BEAN'S ATMOSPHERIC SIGNAL.

is a safeguard against the dangers arising from open switches and draw-bridges; and it is also applicable to stations and crossings. A brief account of this device is given in appendix G. The Old Colony road has tested this device by using it at exposed points for more than two years, gradually increasing the number of instruments in use, and now having them working at distances varying from 1000 to 1400 feet at one draw bridge, two stations and four switches. This signal is simple and inexpensive; and, so far as it has been used, and for what it undertakes to accomplish, it seems to be an almost faultless device.

In the appendix also may be found tables showing some results of the working of Hall's and of the Union electric signals; also brief accounts of devices which were exhibited to the board, but which are not subjects for full reports, because they have not been put to the practical test which is needed before such report can be made.

In conclusion, it is evident that the time has not come when the adoption of any one of the devices exhibited for giving automatic signals should be required by law. No party has asked for legislation; and Mr. Hall strongly disclaims any desire for legislative action. Nor, pending further experience on the part of railroad men, and further experiments by electricians and other inventors, can it be thought strange that railroad companies hesitate to equip their roads fully with imperfect devices, which may soon be set aside for better. Many ingenious men are giving their thoughts to railroad signals. The laws of the force, which most of them are trying to use, are not fully known, and the force is not capable of entire control. The railroad managers of England, and, indeed, of Europe, are more than skeptical as to the use of automatic signals, electric or otherwise. They would regard reliance upon such signals as criminal recklessness, if they were not supplemented by other appliances. Many railroad men in this country share this feeling; and this refers not only to railroad managers, who might be suspected of being influenced by undue economy, but to skilled superintendents and other experts who have no such motive. At present, no one has the right to say of any system of signals, as a whole: "This is the system that ought to be adopted on all roads." The desire is natural that some tribunal should decide at once which is the best, and that the Legislature should order its adoption. But the time for such a decision has not yet come, even if any automatic device can ever be found which will alone answer all the purposes of a safety railroad signal.

Yet it should be remembered that these imperfect devices do render great service in announcing danger and preventing accidents. The worth of a safety signal is to be estimated chiefly, not by counting the number of its false alarms, but by its well-founded alarms. Even an occasional failure to give warnings of danger, while it forbids sole and implicit reliance upon an automatic signal, does not prevent its being of great value as an auxiliary. When the terrible consequences of a railroad disaster are considered, a preventable accident becomes a crime. The public have a right to expect that their safety will be guarded by every reasonable precaution, and that devices designed for this end should not be rejected, simply because they have not attained perfection. Railroad managers should be quick to guard their tracks, and especially all draw-bridges and other points of special danger, by those appliances that seem to them best adapted to insure safety. It is proper to add that our chief railroad companies have shown a praiseworthy spirit, both in testing new inventions and in adopting those that, upon trial, have commended themselves to their judgment.

Contributions.

The Stability of Trestles and Trestlework Piers.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Whatever conclusions may be reached in regard to the fall of the Tay Bridge, we cannot help seeing that, compared with other works of the kind, its piers were exceedingly unstable. To show this, the sheet of sketches herewith is presented, giving several of the most important works of this class in the United States and elsewhere, all being drawn to the same scale, and all representing the side of the pier, i. e., its dimension at right angles to the length of the bridge. Nos. II, III, IV, V, VI, VII, VIII and IX are trestle piers, the area and form of the base being shown directly below the elevation. The remaining figures are single trestles, which in the different works to which they belong are placed from 15 to 30 feet apart.

No. I is one of the highest bents of the Lyon Brook Trestle, on the New York & Oswego Midland Railroad, built in 1869, at the Phoenixville Bridge Works for the Baltimore Bridge Company. There are 24 spans of 30 feet each, and a central opening of 100 feet. The central trestles are 130 feet high, made in four equal stories of 30 feet. Each trestle consists of two legs, composed of wrought-iron flanged columns, 8 feet apart at the top, and battering one in eight, thus making a breadth of 38 feet at the base. The two legs are connected by struts and ties both to each other and to the adjoining trestle.

No. II is the trestle pier of the Watkin's Glen Viaduct, upon the Syracuse, Geneva & Corning Railroad, in New York, built by the Niagara Bridge Works. This pier is 8 feet wide at the top chord of the truss, and 55 feet 8 inches at the base. The height is 143 feet above the masonry, and the length of the pier, in the direction of the road, is 31 feet,

the four legs being well connected with struts and ties, and making a rectangular base of 31 x 55½ feet. No. III is one of the trestle piers of the Crumlin Viaduct, on the West Midland Railway, England, between Monmouth and Newport. The plan is hexagonal, the extreme dimensions being, at the base, 60 x 27 feet, and at the top 30 x 18 feet. The height is 174 feet. Each pier is composed of fourteen cast-iron posts in sections 17 feet long, the diameter being one foot and the metal one inch thick. These piers are placed 150 feet apart, and carry an iron Warren girder. No. IV is a pier of the Beulah Viaduct, upon the South Durham & Lancaster Union Railway, in Westmoreland. The height is 170 feet, the width on top 22 feet and at the base 50 feet. The rectangle of the base is 15 x 50 feet. No. V is the high pier of the Verrugas Viaduct, built by the Baltimore Bridge Company for the Lima & Oroya Railway, in Peru. The width on top is 15 feet and at the base 60 feet, the length in the direction of the road being 50 feet, thus making the rectangle of the base 50 x 60 feet. The whole height is 252 feet, in ten stories, the batter being one in twelve. The spans between the piers are 100 and 125 feet. No. VI is one of the trestles of the Rapallo Viaduct at Flat Brook, on the New Haven, Middletown & Willimantic Railroad (Conn.), made by Kellogg & Clarke. The width on top is 17 feet, and at the bottom 31½ feet, the height being 58½ feet. The spans are 30 feet. No. VII is a pier of the Kentucky River Bridge on the Cincinnati Southern Railroad, built by the Baltimore Bridge Company. The height is 214½ feet, the rectangle of the base 28 x 71½, and the top 1 x 18. Each pier has four legs, the whole being substantially braced. The spans are 37½ feet each. No. VIII is the pier of the Tay Bridge. The height is 82 feet, the length of the hexagonal base 21 feet 10 inches, and the breadth 12 feet. The length of the pier on top is 19 feet 10 inches, and the breadth 10 feet. The long spans were 245 feet. No. IX is a pier of the Portage Viaduct over the Genesee River, on the Buffalo Division of the Erie Railway. The work was built by the Watson Manufacturing Co. from designs by Mr. George Morrison. The spans are 100 and 110 feet. The iron piers are 200 feet high, 20 feet wide on top, and 70 feet at the bottom, the rectangle of the base being 50 x 70.

No. X is an excellent timber trestle by P. H. Dudley, upon the Valley Railroad at Old Forge, Akron, Ohio. The height is 40 feet, the batter 3 inches per foot, the width, from centre to centre of the outside inclined posts, at the top, six feet, and at the base 25½ feet. The trestles are 16 feet apart. No. XI is a design by Mr. Morrison for a trestle in which the width toward the bottom is so great that the lateral bracing would become badly proportioned if carried across the entire breadth. No. XII is a design for a temporary trestle to be made entirely of 3-inch plank. No. XIII is designed by Mr. Carl Phil for the Norwegian railways.

In all of the above, the masonry on which the iron-work stands is supposed to be perfectly stable and no account made of it, though in several of the cases it is quite high, and in a sketch adds to the apparent instability of the structure.

The writer has in his possession a large number of photographs and drawings of both trestles and trestle-piers, which have been built in the United States, nearly all of which show a very wide-spread base. Two, however, do not; and as far as can be judged by photographs they do not look very stable. One of these is the Wissahickon Pipe Bridge, near Philadelphia, which appears to have spans of considerable length, and to rest on four-legged eight-story trestles, quite high, which look narrow and seem to have but little batter. To be sure, no great damage would be done if the work should blow over, as it is not used for travel. The second work is more important. It is the Rosendale Bridge on the Wallkill Valley Railroad, built by the Watson Manufacturing Co. This work is 876 feet long and 150 feet high in all. Judging from the photographs, the iron columns which stand upon the stone piers and hold the truss, are about 100 feet high, each pier consisting of four posts, two under each truss, and a single inclined brace both up and down stream, thus making a hexagonal base. These inclined members, though connected with the main columns by struts and ties, look very small, and the impression got from the whole combination is that the piers would not offer any great resistance to a severe lateral thrust. This, however, is only an impression from a photograph. The bridge itself may look differently.

GEORGE L. VOSE.

To Find Angle of Curves to Reverse between Two Parallel Tracks.

TO THE EDITOR OF THE RAILROAD GAZETTE:

B B and C C, fig. 1, are centre lines of two parallel tracks.

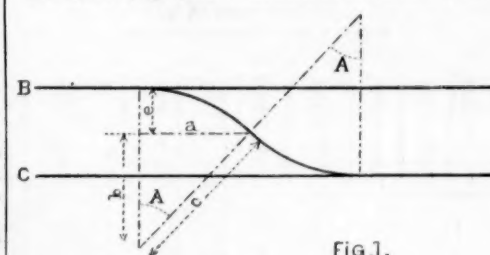


FIG. 1.

A = angle at centre = twice deflection angle.

c = radius.

e = ½ dist. between tracks.

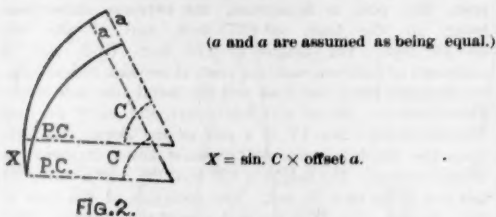
b = radius less ½ dist. between tracks = c - e.

b

cos. A = — = radius minus ½ dist. between tracks divided by radius.

The following problem is useful in location, where it is de-

sired to move the point of curve forward or back to pass the curve (of same degree as trial curve) through a point whose distance to the right or left is known:



In crossing from one parallel track to another, to join the equal reverse curves by a tangent:

A and B, fig. 3, represent the parallel centre lines of two tracks.

Multiply the length of curve or chord (a) by the degree of curvature, which will give the number of degrees (b) at the centre, which also equals (b) in triangle, EC and D. Find tangent deflection (d) for length of curvature (a), double it, and subtract this from centre of tracks (H). Then (x) the tangent required equals this remainder (h) divided by the sine of (b).

$$x = \frac{h}{\sin b}$$

For convenience (d) may be taken as the gauge of the tracks—usually = 4.7 ft., and (a) can be taken from the foregoing switch tables.

(d) = square of distance from heel of switch to frog point, multiplied by tangent deflection for one station of a one-degree curve (0.873) multiplied by degree of curve.

FORMULAE FOR SWITCHES.

R = radius.
D = degree of curve.
c = chord from heel of switch to point of frog.
t = movement of switch rail or "throw."
F = frog angle.
F' = " of crotch frog.
s = length of switch rail.
g = gauge of track.
P = proportion (or No.) of frog.
P' = " of crotch frog.
T = tangent deflection for one station (100 ft.) of a one-degree curve = 0.873.

$$R = \left(\frac{g}{\sin F} \right) \cot \frac{1}{2} F - \frac{1}{2} g = \frac{g \times \cot^2 \frac{1}{2} F}{2}$$

$$c = \frac{g}{\sin \frac{1}{2} F} = \sqrt{2 R g + g^2} = \sqrt{\frac{g}{T D}}$$

$$c' = \sqrt{\frac{1}{2} g c^2} = \sqrt{\frac{1}{2} g} = \sqrt{\frac{1}{2} g} = 0.707 c$$

$$s = \sqrt{\frac{c^2}{g}} = \sqrt{\frac{1}{2} g} = \sqrt{\frac{1}{2} g} = 0.707 c$$

$$\sin \frac{1}{2} F = \frac{c}{R + \frac{1}{2} g} = \frac{c}{2 R + g}$$

$$F = D \sqrt{\frac{g}{T D}} = \sqrt{\frac{g D}{T}} = \text{length of curve from heel to pt.} \times D$$

$$\sin \frac{1}{2} F' = \frac{c'}{2 R + g}$$

$$F' = D \sqrt{\frac{1}{2} g} = \sqrt{\frac{1}{2} g D} = \text{length of curve from heel to point} \times 2 D$$

$$P = \frac{\cot \frac{1}{2} F}{2}$$

$$P' = \frac{\cot \frac{1}{2} F'}{2}$$

Approximately,

s = distance from frog point to point of crotch frog, 2 g x No. of frog = distance from heel to point of frog.

FROG TABLE, NO. 1.

Gauge, 4' 8 1/4". Throw of rail, 5 inches.

Frog No.	Frog angle	Deg. of curve	Radius	Switch rail	Toe to frog point	Heel to frog point	No. of crotch frog	Angle of crotch frog	Toe to crotch frog
4	14° 16'	38° 54'	150.2	11.5	26.4	37.9	2.8	20° 21'	15.1
5	11 26	24 34	235.0	14.1	33.2	47.3	3.5	16 14	19.2
6	9 32	17 00	338.7	16.8	39.8	56.6	4.2	13 35	23.0
7	8 10	12 26	461.8	19.6	46.5	66.1	4.9	11 37	26.9
8	7 10	9 33	600.0	22.3	53.2	75.5	5.7	10 8	30.9
9	6 22	7 31	761.6	25.1	59.7	84.8	6.4	9 1	34.7
10	5 44	6 6	938.6	27.8	66.3	94.1	7.1	8 8	38.4
11	5 12	5 1	1141.8	30.8	73.0	103.8	7.8	7 22	42.4
12	4 47	4 13	1358.2	33.6	79.6	113.2	8.5	6 44	46.1

FROG TABLE, NO. 2.

Gauge, 3 feet. Throw of rail, 4 inches.

Frog No.	Frog angle	Deg. of curve	Radius	Switch rail	Toe to frog point	Heel to frog point	No. of crotch frog	Angle of crotch frog	Toe to crotch frog
4	14° 16'	38° 54'	96.0	8.1	16.1	24.2	2.8	20° 21'	9.0
5	11 26	24 34	150.6	10.1	20.1	30.2	3.5	16 14	11.3
6	9 32	17 00	215.7	12.0	24.1	36.1	4.2	13 35	13.5
7	8 10	12 26	294.3	14.0	28.1	42.1	4.9	11 37	15.8
8	7 10	9 33	382.5	16.2	31.8	48.0	5.7	10 8	17.9
9	6 22	7 31	484.9	17.9	36.1	54.0	6.4	9 1	20.2
10	5 44	6 6	598.5	19.9	40.1	60.0	7.1	8 8	22.5
11	5 12	5 1	722.9	21.9	44.1	66.0	7.8	7 22	24.0
12	4 47	4 13	859.7	23.9	48.0	71.9	8.5	6 44	26.9

* Crotch frog is the central frog of a three-throw switch; the other two frogs being equal and of the number named in the first column of the following tables.

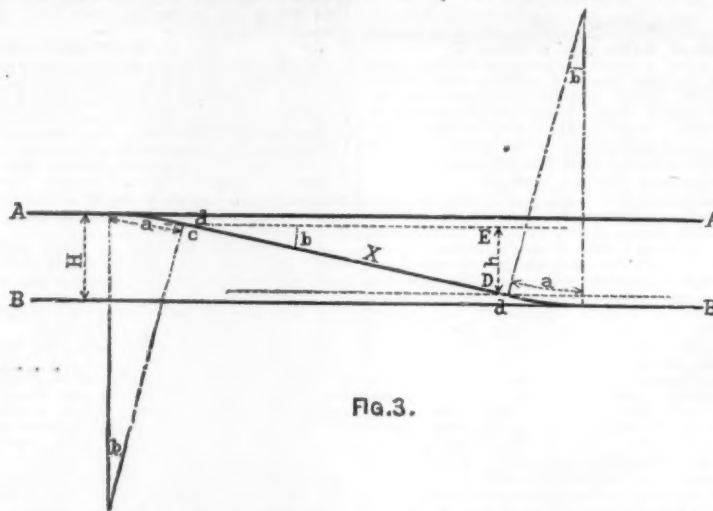
FROG TABLE, NO. 3.
Gauge, 3 feet. Throw of rail, 5 inches.

Frog No.	Frog angle	Deg. of curve	Radius	Switch rail	Toe to frog point	Heel to frog point	No. of crotch frog	Angle of crotch frog	Toe to crotch frog
4	14° 16'	38° 54'	96.0	9.0	15.2	24.2	2.8	20° 21'	8.1
5	11 26	24 34	150.6	11.3	18.9	30.2	3.5	16 14	10.1
6	9 32	17 00	215.7	13.5	22.6	36.1	4.2	13 35	12.0
7	8 10	12 26	294.3	15.7	26.4	42.1	4.9	11 37	14.1
8	7 10	9 33	382.5	17.9	30.1	48.0	5.7	10 8	16.2
9	6 22	7 31	484.9	20.1	33.9	54.0	6.4	9 1	18.0
10	5 44	6 6	598.5	22.4	37.6	60.0	7.1	8 8	20.0
11	5 12	5 1	722.9	24.6	41.4	66.0	7.8	7 22	21.3
12	4 47	4 13	859.7	26.8	45.1	71.9	8.5	6 44	24.0

A British Workman on the Tay Bridge and Bridge Workmanship.

A correspondent in the New York Evening Post, who writes from Manchester, England, and signs himself "A British Workman," says, in commenting on the Tay Bridge accident:

We have great faith in our own handiwork, when it is planned by great minds, superintended by the highest talent and constructed on the most approved principles. And all these were included in the Tay Bridge. But it must always be borne in mind that the disaster was no fault of the bridge itself, which, as a workman, I believe to have been absolutely faultless, as bridges go. I have the good fortune to know a few workmen also who have traveled over the bridge, and they unhesitatingly assert that it would be the train itself that was blown over—top-tilted, as it were, by the force of the wind—till it ran on one set of wheels only, grinding against the guard and hand-rails till this one-sided moving weight of the train, aided by the one-sided



Excessive Legislation in Regard to Railroads.

Congress and nearly every state legislature are constantly called upon to legislate in regard to railroads and public carriers. The popular impression is that railroads are dangerous to public interests in the same proportion in which they are able to command credit or to purchase rival roads and subsidiary lines. The great consolidations which have recently taken place have alarmed many people who are now supporting the Reagan bill or other propositions in Congress by which the federal government is enabled to check the supposed powers of the railroad. Nor can it be disputed that many railroads have treated their friends with extraordinary kindness, and their opponents with more than legitimate severity. Leading roads have favored some of their patrons by giving them exceptional rebates, and a complete stranger is not always sure that he will be treated as well as an old shipper who knows all the men in charge, and who knows where to go in case he wants to conclude some special contracts. The true principle is, that all shippers should pay like prices for like services, that the tariff rates should be ascertainable beforehand from the published schedules, and that there should be no deviation from these. Merchants in Boston, and particularly in New York, complain that this rule is not general, and that shippers do not always pay like prices for like services.

Meanwhile, the popular impression that the railroads are plundering the people is entirely erroneous. The enormous fortunes of the railway magnates are not the result of legitimate dividends, but of stock operations and incidental transactions. The average railroad dividends are absurdly small, and generally below those of government bonds. The freight and fare paid by the average customer are again extremely moderate and far below European rates for similar services. It is certainly absurd to complain of the railroad corporations when an average mechanic can earn in day enough to pay for the freight on all the breadstuffs which he and his family will consume during the course of a whole year. The average rates charged by the railroads are not excessive, and the exceptional cases do not call for the sweeping legislation proposed by Mr. Reagan, Mr. Sapp and others. But as almost all the roads are chartered by some state, that state should supervise the roads within its jurisdiction closely, and when a manifest injustice prevails either the state legislature or the railroad commissioners detailed by it should enforce a remedy. But it would be a mistake to ask Congress for a remedy in matters where the real jurisdiction rests in the state legislatures. Not one of the leading railroad states has its various lines less consolidated and its road system less complete than Massachusetts, yet no problem has arisen here which called in any sense for Congressional interference on behalf of the people. The other states, indeed, would do well to do in their respective fields what the authorities in Massachusetts have done so satisfactorily here.

A general act of Congress would have to be based upon the present state of the railroads; hence the former would be antiquated as soon as the latter have emerged from the present situation. And this will happen very soon. In France there are really but seven great railroad corporations, in England about twelve, while the Belgian, German, Austrian and Italian railroads will soon be conducted entirely, or almost entirely, by the governments. No person familiar with our political institutions favors the adoption of the German system in the United States. Meanwhile, experience here is very much the same as in France and England—that is to say, as time advances, the roads consolidate. But consolidation at large has barely begun, and in New England the beginning has neither been general nor even vigorous. Ten years hence the railroad map of Massachusetts, in particular, will be radically unlike what it is to-day, both as to trunk lines and as to ownership. St. Louis is in a similar position; so is Louisville, so is Detroit, so is Chattanooga, so is Savannah, and so are scores of other places. Only Chicago, New York, Philadelphia and Baltimore have anything like a complete system of trunk railroads. The present evils are not felt by the people at large, but by individuals, and perhaps by some localities. They are entitled to relief, but it does not appear that Congress should furnish it. The acts before Congress are involving constitutional questions that have not been settled, and they refer to a state of affairs which will have ceased a year from to-day.—Boston Advertiser.

moving weight of the wind as well, and all on one side of the immovable bridge, proved rather too much for this immovability, and therefore the whole portion, with its living and mechanical cargo, "moved" toward the bottom of the Tay. When the nature and extent of the accident became known there was not a heart in England but what was very much moved as well as the dreadful, terrible tidings. It was like as if people could not give over talking about it because they could picture the whole thing so well. And a most horrible picture your imagination made of it. Fancy an express railway train full-freighted with passengers, men, women, and children, being "signaled off to sea" in the midst of a perfect hurricane; imagine the dismay when the carriages were lifted up on one side by the force of the wind and the passengers tumbled over to the other side; then try to realize their huddled position; the grinding of the wheels, the thumping and the bumping, and then the final dive and crash which carried the living cargo to its final and fatal destination. This is the way we kept picturing it in our workshops, and I believe everybody else did the same. Surely after this they will give the same protection to those who "go down to the sea" in railway trains, as they do to those who do the same in ships, for the former have not half the chance that the latter have in a sudden squall. For that reason I hope that, for the future, proper precautions will be taken during storms and high winds, to prevent any train going over elevated or other bridges that are likely to be affected by the passage of trains over them during such storms. If ships have to be kept in harbor, trains must be kept in stations, rather than life be risked. As I worked some years for the firm who took the original contract for this bridge I think I ought to say that they employed good workmen (if you can excuse the little egotism there is about this), used good material and executed the mechanical work about bridges with their own tools and machines—their punching and shearing machines, riveting and rivet-making machines being perfect marvels of accuracy and strength. My period of employment under them will always be remembered by me as the period when I was better paid than ever I was in my life. But I may also say that my opinion of bridge and girder work is that at its best it is very bad. Large, roughly-punched-out holes, small, roughly-finished rivets to fill them, with parts considered to be well in proportion that were from an eighth to a quarter of an inch out of proportion, are things I could never understand in this sort of work. Of course, you do not expect the wonderful accuracy of a Whitworth, or the nicety of a Nasmyth in these matters, but I think there ought to be much greater exactitude than there is over structures that have to carry such precious freights.

Early Railroad Telegraphs.

The Port Jervis Gazette, after referring to the often-told story of how Charles Minot, when General Superintendent of the Erie, first ran a train over the road by telegraph, says:

"Mr. Wilmot M. Vail, of this village, however, says that this incident is antedated by many others of railroad men availing themselves of the use of the telegraph to help their trains along. When the Erie road was completed as far as Otisville, Ezra Cornell, of Ithaca—he who established Cornell University—was then a poor man. The use of electricity in transmitting messages had only recently been discovered and the Morse alphabet perfected. Mr. Cornell foresaw the value of this discovery long before the people generally had any idea about it. He obtained a charter for running a telegraph line from New York to Lake Erie. By going to such places as Goshen, Newburgh, Honesdale, Binghamton and so forth, and getting the people to subscribe a few thousand dollars, he was enabled to construct a line of telegraph from New York to Erie or Dunkirk. It ran up the Hudson on the east side to Butternut Hill where it crossed the Hudson and ran up to Newburgh, and thence to Goshen and Otisville, crossing the mountain at the latter place, and following along the Forestburg turnpike to Narrowsburg, where it crossed over into Wayne County, Pa., and next reached Honesdale, thence Carbondale, Montrose, Binghamton and so on west. This was the first telegraph line in this section until some time after the Erie road was completed to Binghamton.

"The office at Goshen was in charge of Mr. Nathaniel

Vail, brother of W. M. and R. M. J. Vail, of this village. Cornell spent much of his time there and in that office while his old line was up.

"It was not until after the Erie road had been completed as far west as Binghamton that the telegraph was used to help trains along. It was then done in this way: It was the orders of the Erie Company that if a train on time had waited an hour at a station for a delayed train, it would have the right to proceed. Mr. Vail says that Benjamin Hall ran the way freight from Newburg to Port Jervis, and he would often step into the telegraph office at Goshen, when the train from the west was delayed—which was often the case—and ask Mr. Vail if he could not find out at Port Jervis or Narrowsburg if the train had left there yet, and if so how long it had been gone. On the information thus obtained he often ran his train to Port Jervis, arriving here only a little behind his schedule time.

"This manner of running a train was not authorized by the Erie Company; in fact, the company did not recognize the use of the telegraph at all in this direction, but the conductors soon learned that they could often get along better by having a brief message in relation to the train they should have met at a given station."

RAILROAD LAW.

Injury to Employee—Liability of Company.

The opinion of the Supreme Court of the United States in *Hough vs. The Texas & Pacific Co.* (10 Cent. L. J., 108), analyzes with much clearness the limitation of the employer's exemption from liability to his servant for injury resulting from negligence. In that case, *Hough*, an engineer, was running a locomotive, which collided with a cow on the track. This threw the engine down the bank, and steam and water escaping from the whistle or safety valve scalded him to death. His administratrix sued for damages and gave evidence to show that deceased had objected to the master mechanic and the round-house foreman that the cow-catcher was defective, and they had repeatedly promised to remedy the defects but failed to do so; and that both incidents constituting the casualty were the result of these uncorrected defects. The defendants gave evidence tending to controvert these points.

The Court says that the obligation is on the master, whether a natural person or corporate body, not to expose the servant, when conducting the master's business, to perils or hazards against which he may be guarded by proper diligence upon the part of the master. To that end the master is bound to observe all the care which prudence and the exigencies of the situation require, in providing the servant with machinery and other instrumentalities adequately safe for use by the latter. It is implied in the contract between the parties that the servant risks the dangers which ordinarily attend or are incident to the business in which he voluntarily engages for compensation; among which is the carelessness of those, at least, in the same work or employment, with whose habits, conduct and capacity he has, in the course of his duties, an opportunity to become acquainted, and against whose neglect or incompetency he may himself take such precautions as his inclination or judgment may suggest. But it is equally implied in the same contract that the master shall supply the physical means and agencies for the conduct of his business. It is also implied and public policy requires that in selecting such means he shall not be wanting in proper care. His negligence in that regard is not a hazard usually or necessarily attendant upon the business. Nor is it one which the servant, in legal contemplation, is presumed to risk, for the obvious reason that the servant who is to use the instrumentalities provided by the master, has ordinarily no connection with their purchase in the first instance, or with their preservation or maintenance in suitable condition, after they have been supplied by the master.

A railroad corporation may be controlled by competent, watchful and prudent directors, who exercise the greatest caution in the selection of a superintendent or general manager, under whose supervision and orders its affairs and business, in all of its departments, are conducted. The latter, in turn, may observe the same caution, in the appointment of subordinates at the head of the several branches or departments of the company's service. But the obligation still remains to provide and maintain, in suitable condition, the machinery and apparatus to be used by its employees—an obligation the more important, and the degree of diligence in its performance the greater, in proportion to the dangers which may be encountered. Those, at least, in the organization of the corporation, who are invested with controlling or superior authority in that regard, represent its personality; their negligence, from which injury results, is the negligence of the corporation. The latter cannot, in respect of such matters, interpose between it and the servant, who has been injured without fault on his part, the personal responsibility of an agent who, in exercising the master's authority, has violated the duty he owes, as well to the servant as to the corporation.

To guard against misapplication of these principles they add that the corporation is not to be held as guaranteeing or warranting the absolute safety, under all circumstances, or the perfection in all of its parts, of the machinery or apparatus which may be provided for the use of employees. Its duty, in that respect, to its employees is discharged when, but only when, its agents whose business it is to supply such instrumentalities, exercise due care as well in their purchase originally, as in keeping and maintaining them in such condition as to be reasonably and adequately safe for use by employees.

It was also contended by the defendants that the engineer was guilty of such contributory negligence as to prevent the plaintiffs from recovering. Upon that branch of the case, the Court says, if the engineer, after discovering or recognizing the defective condition of the cow-catcher or pilot, had continued to use the engine, without giving notice thereof to the proper officers of the company, he would undoubtedly have been guilty of such contributory negligence as to bar a recovery, so far as such defect was found to have been the efficient cause of the death. He would be held in that case to have himself risked the dangers which might result from the use of the engine in such defective condition. But where a master has expressly promised to repair a defect, the servant can recover for an injury caused thereby, within such a period of time after the promise, as it would be reasonable to allow for its performance, and, as we think, for an injury suffered within any period which would not preclude all reasonable expectation that the promise might be kept. That the engineer knew of the alleged defect was not, under the circumstances and as matter of law, absolutely conclusive of want of due care on his part. In such a case as that here presented, the burden of proof to show contributory negligence was upon the defendant.—*New York Daily Register.*

A Land Grant Decision.

The Secretary of the Interior has given his decision in the case of *Pierpont Orton* against the Southern Pacific Railroad Company, involving an application to enter a certain tract of land in the Visalia (Cal.) District, under joint resolution of June 18, 1870, which tract was patented to the company in 1877. The Secretary maintains that, notwithstanding

standing the settlement of Orton, prior to the passage of the joint resolution mentioned, his right to the land was forfeited by his failure to present his claim within the time prescribed by law, and that the patent to the company, issued in the regular course of business, without notice of Orton's claim, must stand. The Secretary declines to recommend suit by the United States to vacate the patent, but leaves the claimant to his remedy in the local courts. The decision is one of general importance, owing to the fact that it will control the action of the Land Department in a number of similar cases now pending. It is, of course, subject to revision by the courts.

Carrying Passenger Beyond a Station.

The case of *The Ohio & Mississippi Company* against *Swarthout*, appeal from Circuit Court, in the Indiana Supreme Court, was an action by appellee against appellant for damages occasioned by being carried past a station to which he had purchased a ticket. Held, that there is no substantial difference between this case and that of the same company against *Hatton*, 60 Ind., 12, in which the complaint was held insufficient. It does not appear by the complaint that the company undertook to carry the plaintiff upon any particular train, nor that the train by which he took return passage was one which, by the public running arrangements made by the company, stopped at the station in question. The words on the ticket, "Good on passenger trains only," were intended to prevent any implication that the company was bound to carry the holder on freight, or anything but passenger trains. They did not impose any obligation on the company to carry the holder on any passenger train that did not, in accordance with the public running arrangements of the company, stop at the place named, and to stop there, contrary to those arrangements, to discharge him.

Bondholders' Rights and Foreign Legislation.

In *Gebhard* against the *Canada Southern Co.*, in the United States Circuit Court in New York, the suit was brought to recover certain obligations issued by the defendant corporation, representing the settlement of interest due and unpaid on defendant's issue of first mortgage bonds. The case, for convenience, may be considered as though the action were brought to recover several installments of interest due on Jan. 1, 1877, upon the first mortgage bonds of the defendant, which bonds were executed in Canada and payable in the city of New York. The defendant is a Canadian, and insists, in defense, that the corporation is discharged from the payment of those bonds by virtue of an act of Parliament of the Dominion of Canada, passed in 1878, whereby the defendant was authorized to issue new bonds, payable in thirty years, in substitution of its first mortgage bonds and bearing a lower rate of interest. This act declares that the assent of the holders of the first mortgage bonds shall be deemed to have been given to the substitution of the new bonds. The plaintiff never assented to this substitution of the new bonds in place of the first mortgage bonds.

The Court says if any one of our states had passed such an act as the one under consideration, it would have been the duty of the courts of that state to treat it as an unlawful exercise of power, and certainly it cannot be expected that this Court would tolerate legislation by foreign states which it would not sanction if passed here, and which, if allowed to operate, would seriously prejudice the rights of the states. In concluding, his Honor says, "Comity can ask no recognition of such foreign legislation, and the case falls under qualifications of the general rule which prescribes that when foreign law is repugnant to the fundamental principles of the *lex fori*, it will be ignored."

THE SCRAP HEAP.

It was too Much for Him.

When Frank E. Snow, the energetic General Passenger Agent of the Canada Southern Railroad, had his headquarters in Detroit, he was suspected of having the biggest and most sympathetic heart of any man in the railroad business. There was a limit, however, even to his sympathy. One day last spring a forlorn-looking man called at his office, and asked for a pass for himself and wife to St. Thomas, Canada. His story of destitution and lost tickets was enough to melt a heart of stone, and he got the pass. This was early in the morning. About noon he returned to the office, his face longer than ever, and said:

"When I was here before, I forgot to say we had a dog. He's an awful good dog, and we have to leave him behind. Is it asking too much for you to pass him too?"

Mr. Snow wrote a line to the baggage-master, and the man went away expressing his gratitude. In an hour he was back again, and when asked if there was anything more that could be done, he explained:

"The old woman an' me have struck a payin' job down here in a boardin' house, and we think we won't go on. There's another family down at the depot, who are going out to-night, and if you'll alter this pass from two persons and a dog to five folks and an Injun pony, I kin sell it to 'em for \$3, and be just that much ahead!"

It pained Mr. Snow's big heart to do it, but he reached out for the pass and tossed it into a drawer, and advised the woe-begone man to get into Canada by the highway when he left Detroit.—*Detroit Free Press.*

Mustn't Do It Again.

An accident occurred in Thomaston some years ago in connection with the Naugatuck Railroad Company, that has probably never appeared in print. A man by the name of Darrow owned a number of cows, and one day they escaped the confines of their pasture and strayed on to the car-track. The engine of a passing train ran over and killed two of the animals. Next day Mr. Darrow went to Mr. Waterbury, then Superintendent of the road, and, after explaining the matter of his loss to him, asked him what he would do about it. Said Mr. Waterbury: "Was any damage done to the road, as you saw?" "Why, no, not as I know of," said Darrow. "Was the engine or any of the cars injured in any way?" "No, of course not," said Darrow. "Well, then," said Waterbury, "if no damage was done to the company, I won't do anything about it; but you must be careful not to allow such a thing to occur again."—*Waterbury (Conn.) American.*

Why Prices for Rails have Risen.

The following statement of the advance in the prices of materials out of which rails are made is given in Mr. Wm. P. Shinn's argument on the proposition to reduce the duty on steel rails, and present facts which are likely to be neglected in considering the higher prices now charged not only for rails, but for rolling stock and many other materials, and which must hereafter be charged by the railroads themselves in order to cover the growth of their expense accounts:

"Reference will doubtless be made in the arguments before your committee to the great advance that has taken place in the prices of American rails, say from \$40 per ton one year ago to \$80 now, and it is worth while to inquire the cause for and the effect of this advance. The cause is not hard to see. Bessemer pig-iron was plenty one year ago at from \$18 in the East to \$20 in the West per ton; similar iron now costs \$45 to \$50 per ton, and not a Bessemer rail mill in

this country can afford to buy pig-iron at \$50 per ton and sell rails made from it at \$80; therefore the benefit of the advance does not inure to the manufacturer of Bessemer rails, unless he also manufactures his pig iron. Republic iron ore, which sold at Cleveland in 1878 at \$6 per ton, is now held at \$12.50 per ton. Coke for the manufacture of iron, which sold in the Connellsville coke region one year ago at 90 cents per ton at the ovens, now sells at \$3 to \$3.50 per ton, and there is a strong prospect of the price being advanced to \$4. Common bar iron, which could be bought in Pittsburgh one year ago below \$1.75 per hundred pounds, now costs \$4 per 100 pounds, and the supply is not equal to the demand."

Receipts from the Miller Coupler Patent.

During the argument before the House Committee on Patents concerning the proposition to extend the Miller car-coupling patent by act of Congress, it appeared that Colonel Miller had received something more than \$253,000 from the railroads for his patent since it was granted, March 31, 1863. He claimed, however, that his expenses had been so great as to leave him an inadequate compensation for his patent.

Belgian Contracts.

It is reported that the Belgian government will soon let contracts for the construction of 100 locomotives, which is a considerable addition to make for a system of less than 2,000 miles, in view of the fact that it is already heavily equipped. On the 28th of January it was to open bids for 10,000 tons of iron rails, for which old rails were to be taken in part payment. It seems strange that it should buy iron. At the same time a Dutch company and a Belgian private railroad company is taking advantage of the high price of old rails to sell its iron rails and buy steel. Three months ago the Belgian state railroad administration refused to accept a bid to exchange new steel rails for the same weight of old iron plus \$3.70 per ton. Steel rails, 54 lbs. to the yard were quoted lately in Belgium at \$48.50 per ton, having been sold less than a year before at less than \$21.

Cost of Belgian State Railroads.

The Belgian state railroads at the close of 1878 included 1,192 miles of road owned and 198 miles leased and worked for a percentage of the receipts. The cost to the state, including rolling stock for the lines leased as well as those owned, has been at the average rate of just about \$130,000 per mile, which is more than twice the average cost of United States railroads, but only two-thirds the cost of British railroads. The latest acquisition of the state (that is, of the lines worked in 1878) was the Flanders system, 150 miles. The receipts of this acquisition were \$333,400 in 1878, and the expenses only \$1,400 less; but the system is said to have required unusual expenditures for repairs and renewals this year, the former owners having let it run down, as it had never been profitable.

Life of Rails from the Edgar Thomson Works.

In Mr. Wm. P. Shinn's argument on the proposed reduction of the duty on steel rails, the following statement is made with regard to the intimation that American rails have not been of so good quality, as if there had been foreign competition:

"The Edgar Thomson Steel Company, Limited, with which I was connected as general manager from the date of its organization until Oct. 1, 1879, has made, and presumably there have been laid in the track, of its rails:

	Tons.
In the last four months of 1875.....	6,562
In the year 1876.....	32,238
In the year 1877.....	49,425
In the year 1878.....	64,505
In nine months of 1879.....	55,568

Making a total to Oct. 1, 1879, of.....208,288

"Of this amount there had been reported to me as having in some measure failed and been consequently taken out of the track, up to Oct. 1, 1879, 29 rails, equal to about 7 tons or about one ton in thirty thousand; while a portion of the rails had been in use four years, and the whole had averaged a use of nearly two years in the track. There is no record of foreign rails that I know of equal to this—and we have the petitioners' own authority that it was not stimulated by 'healthy foreign competition.'"

The Cost of Rails as Affecting the Cost of Transportation.

In an argument against the reduction of the duty on steel rails, presented to the Committee of Ways and Means by Mr. Wm. P. Shinn, Vice-President and General Manager of the Vulcan Iron Works, the following calculation is given of the degree in which the cost of transportation is affected by the price of rails:

"It is here intimated, although not distinctly stated, that the cost of maintenance of rails forms a large and important proportion of the cost of operating a railroad. For the purpose of ascertaining what this proportion is, I have referred to the only document at hand, the report of the railroad companies of the state of Pennsylvania to the Secretary of Internal Affairs, for the year 1878, in which I find that the total operating expenses of the Pittsburgh, Fort Wayne & Chicago Railway Company for the year 1878 amounted to \$4,138,173.01, while the expense for iron and steel rails included therein amounted to \$124,653.53, or a little over 3 per cent. of the total operating expenses. On the Philadelphia & Reading Railroad the total operating expenses were \$7,786,282.79; and the expense for rails was \$170,629.85, or about 2 1/4 per cent. From these two cases it is evident that the cost of rails represents from 2 1/4 to 3 per cent. of the cost of operating a well-managed railroad, with large tonnage. If it were possible by a reduction of the duty to \$10 to reduce the price of rails from \$80, the present asking price of American mills, to say, \$66.50, which would be the present price of English rails at the sea-board with \$10 per ton duty added, it would represent a reduction in the price of \$13.50 per ton, or about 30 per cent. of what the railroad companies of this country have been paying for rails during the past two years.

"If the cost of maintenance of rails were 3 per cent. of the total operating expenses, and a saving were effected of 30 per cent. of that 3 per cent., it would amount to nine-tenths of 1 per cent. on the operating expenses. Taking a rate of 35 cents per 100 pounds from Chicago to New York as a basis, a reduction of nine-tenths of 1 per cent. due to this saving in rails would reduce that rate by 0.315 of 1 cent per 100 pounds."

Enforcing a Law to Make Money.

A dispatch from Toledo, O., Jan. 28, says: "Suits to the number of 115 were brought this afternoon before George Veltar, Justice of the Peace, by Leander F. Harris against the Wabash, St. Louis & Pacific, Dayton & Michigan, and Canada Southern railroad companies, for damages under the state law requiring railroad coaches to be provided with self-extinguishing heaters. The penalty is between \$10 and \$500 for each car so rendered unsafe, and the judgments obtained are divided equally between the school fund and the complainant. It will thus be seen that Mr. Harris has gone into quite a speculation, and as judgments in \$30,000 have recently been given in like suits at Mansfield, his chances for realizing something substantial are not bad. He has retained as counsel Messrs. Read & Kinney, of Toledo, and Marvin, Laird & Cadwell, of Cleveland."



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EDITORIAL ANNOUNCEMENTS.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

LOCOMOTIVE BOILER EXPLOSIONS.

Since our last article on this subject was written two "Reports on Experiments on Boiler Bracing," made to the Engineer-in-Chief of the United States Navy, have been received. The results of some of the experiments on the strength of stay-bolts are so apposite to the consideration of this subject that some account will be given of the conclusions which were reached in the report referred to.

One series of experiments related exclusively to the strength of screw stay-bolts, and were made with bolts of 1 in. and 1½ in. diameter, and plates ½ in. thick. In the experiments with iron plates and iron stay-bolts the following results are reported:

"In those with low conical heads, it was observed that the bulging of the plates caused the lap of the rivet-head on the plate to commence giving way or break off some time before the maximum strain was reached, thus leaving more for the threads of the bolts to sustain. As the strain and bulge of the plates increased, the plate around the bolt turned downward and outward until the threads in the plate almost entirely cleared those in the bolts, so that in almost every case there were only from one to two threads stripped or injured on the bolt when it drew out; therefore it was deemed advisable to form the head in a different manner, and, after several experiments, it was decided that the rivet-head should be made as follows: First, by having as much of the bolt through the plate as could be riveted over without injury to the iron, which was, in case of the excellent iron being used, equal in length to about one-half the diameter of the bolt. This was riveted over in the following manner: A few quick, sharp blows were struck on the end, slightly upsetting the iron; the head was then formed to shape with a button-head set made to a spherical segment."

The ultimate average strain required to pull the bolts through the ½-in. plate was as follows:

With supports 4 in. from centre to centre:	Pounds.
1-in. bolt, not riveted.....	21,970
1-in. bolt, ordinary low conical head, 3 threads left through for riveting.....	25,147
1-in. bolt, button-head; length of bolt left through for riveting equal to 7-16 diameter of bolt.....	33,791
1½-in. bolt, button-head; length left through for riveting equal to ½ diameter of bolt.....	38,885
With supports 5 in. from centre to centre:	
1-in. bolt, ordinary low conical head.....	22,137
1-in. bolt, button-head; length left through for riveting equal to 7-16 diameter of bolt.....	31,282
1½-in. bolt, button-head; length left through for riveting equal to ½ diameter of bolt.....	35,812

It will be seen from the above that the resistance of the bolts was increased from 25,147 lbs. to 33,791, or over 34 per cent, in the one case, and from 22,137 to

31,282, or over 40 per cent, in the other, simply by increasing the size of the heads.

It should be noted, too, that the bolts with "ordinary conical heads," which were placed 4 in. apart, had a resistance of 25,147 lbs., whereas those 5 in. apart had only 22,137 lbs. Those with button-heads, 4 in. apart, gave way under a strain of 33,791, while those 5 in. apart stood only 31,282. A similar difference is shown with the 1½-in. bolts. In other words, stay-bolts which are spaced far apart will pull out easier than those which are near together.

Nearly every master mechanic has observed that it is the upper rows of stay-bolts in locomotive fire-boxes which break oftenest. The above experiments then indicate that by adding additional bolts in that portion of the fire-box, not only is the strain on the adjoining ones diminished, but their resisting power is increased. The reason for this is plain to any one who has ever examined a plate from which a stay-bolt has been pulled by internal pressure. Where this occurs it will be found that the threads are seldom stripped from the bolt, but in nearly all cases the plate has been stretched by bulging between the adjoining bolts so as to enlarge the hole enough for the screw to be drawn out without much injury to the threads.

It may be said that the danger in locomotive fire-boxes grows out of the breaking of the stay-bolts and not from their failure by drawing out of the holes, which is true, but it never occurs that all the stay-bolts in a fire-box break. When explosions happen from this cause it is due to the fact that so many bolts are broken in one locality that the strain on those adjoining becomes greater than their power of resistance. If we increase this resistance by enlarging the head, or by putting them nearer together, we diminish the risk of explosion even if some of the bolts are broken. It is also obvious that a boiler with many bolts is not so dangerous with some of them broken as one with few bolts and an equal number broken.

It is desirable, though, to make some provision for detecting broken stay-bolts, especially in those localities where experience has shown that they occur most frequently. The use of tubular stay-bolts has often been recommended, but the chief difficulty in the way of their use seems to be that of getting material to make them of. Very little of the iron, it is said, which is rolled hollow is of good quality; besides, it is very expensive; and to drill holes the whole length of stay-bolts is also costly. It is noticed, however, that nearly all stay-bolts break close to the outside plate. This being the case, if a hole from ¾ in. to 1 in. deep is drilled into the outer end of each, it will be sufficient to detect the great majority of breakages. This plan is now used with great success by some master mechanics, and is one which should be universally adopted.

But it must be admitted that after all is done that can be, or that the most intelligent foresight can anticipate, and even if boilers are constructed in the best possible way, absolute safety is still unattainable. In the ordinary service of a locomotive the processes of destruction go on continually. Every part of a boiler is subject to expansion by heat, contraction from cold and to strain by the pressure of steam. The nature of these effects are so complicated that it is impossible to understand them fully. Corrosion proceeds silently and seldom gives warning of its dangerous work. The question then which presents itself to every locomotive superintendent is how to guard against the insidious effects which are always at work to destroy a boiler. The only reply which can be made to this is, that safety, like liberty, can be secured only by eternal vigilance. Frequent inspection of the condition and test of the strength of boilers is the only means known of determining whether they are safe. Such examination is more imperative, too, from the fact that on very few, if any, roads are all the boilers constructed in the most approved way. It is practically impossible to reconstruct them or to remedy all their defects, and, therefore, the only thing that can be done is to examine and test them frequently by internal pressure, to be sure that they are maintained in good condition.

With reference to the latter, there seems to be an unreasonable prejudice among many master mechanics, and it is especially strong against the use of a cold-water hydraulic test. As it is sometimes expressed, "there is a rigidity about such a test that is injurious to the boiler." Now if the pressure were applied in shocks or sudden pulsations, there might be some ground for this opinion, but even then, why cold water is more rigid than hot water is not apparent. The boiler itself has elasticity enough to resist anything but the severest kind of concussion. It is, of course, true that when cold water is used the boiler plates are

not in quite the same condition as when the boiler is under steam and heated. There is, though, no objection to using hot water for testing by hydraulic pressure, but that the "rigidity" of cold-water pressure causes injury to a boiler has, it is believed, no other foundation for belief than many other superstitions.

But there is another argument which is often urged against the use of a pressure test, which is stated as follows in Wilson's Treatise on Boilers:

"A boiler may be strained without detection, beyond its elastic limit, either locally or generally by the test pressure, so as to render it unsafe at the lower working pressure; or, in other words, a high test pressure may render a boiler unsafe which would otherwise have been safe at the lower pressure used in working it. It is feared that any weakness may be aggravated by the test without being disclosed by it."

To this supposition the author says "such a case is certainly within the bounds of probability." That it is within the bounds of possibility is true, but to analyze the chances of its occurrence would require an investigation into some of the most abstruse questions of the strength and elasticity of materials and the theory of probabilities for which there is not time nor room now and here.

The question, though, is not whether it is possible in some remote degree that such a test may be attended with the danger pointed out, but it is whether there would not be much greater safety resulting from the detection of weak boilers than there would be danger of injury by such a test. Probably nineteen people out of twenty, in the ordinary affairs of life, would adopt the former conclusion. Thus, what is more natural than for a boy to trust himself fearlessly on weak ice if a moment before it has safely supported a full-grown man; or would not any one driving a single horse have his confidence increased a hundred-fold in the security of a suspected bridge, if a two-horse team should cross it safely just before him? A sort of instinct teaches us the probability, approaching to certainty, that any structure which has first borne a heavy load is safe to carry a lighter one immediately after.

Although a pressure test does not assure us of the absolute safety of a boiler, experience shows that it often reveals defects which otherwise could not be detected.

This subject in its practical bearings was so well discussed in an article published in the *London Engineer* as long ago as 1864, and so applicable to the present condition of opinion in relation to it that we make the following quotation therefrom:

"Within the last few years a considerable number of locomotive-boiler explosions have taken place, and in every case upon one or other of the great lines upon which locomotive boilers are never tested by the force-pump. On the other hand, we believe there is no account of the explosion of any boiler regularly tested by the pump upon either of the lines where that test is adopted. The engineers of the Manchester Boiler Association, each having many hundreds of boilers under their care, insist upon the hydraulic test as the only searching inquiry which can be made into the internal character of the boiler; in France the law requires all steam boilers to be tested by the force-pump, and in those parts of the United States where a police inspection of boilers has been adopted, the hydraulic test is always required. Now none of the great number of boilers under the care of the Manchester and the Midland Boiler Associations have exploded for years; explosions are especially rare in France, and even in New York the occurrence of this class of disasters is now unusual. We believe that experience is altogether in favor of a regular test of boilers by water pressure up to nearly, or quite, twice the working pressure. Yet there can be no doubt that the opinion of many well-known and long-experienced engineers is decidedly opposed to this, or, indeed, any kind of testing. * * * This is the feeling, we believe, on the London & Northwestern, London & Southwestern, Great Western, Great Northern, Midland and Northeastern lines, and with, perhaps, one exception, locomotive boiler explosions have been comparatively common in all these lines. It is feared, and we will not say without reason, that a temporary pressure, much beyond that at which the boiler is intended regularly to work, may permanently injure the boiler, and thus cause it to fail at a lower pressure than would otherwise have been the case, or, to put it more strongly, lead to failure, when, otherwise, no failure would have happened. * *

"If a boiler is really as strong as, with what are believed to be the best materials and workmanship, it may be calculated to be, no test up to one-third, or, indeed, one-half this strength, should injure it. Let us suppose that the test pressure is twice the working pressure, and that, in reality, the ultimate strength of the boiler was, in consequence of some local weakness, but twice and a half the working pressure. Here the boiler is already unsound, and although it is possible that the test may aggravate the unsoundness, it is certain both that the weakness will, after a time, show itself in every case, and that, practically, the danger is not greater than before, so long as the working pressure is kept at one-half of that at which the boiler is tested. In other words, 300 lbs. having been borne without visible failure, 125 lbs. to 150 lbs. should be within the limits of safety for a moderate period of time."

In this connection the experience and opinions of those whose business and duties require them to assume the care and inspection of boilers should have especial weight. In 1872 a locomotive boiler exploded on the Highland Railway, in Scotland. Mr. L. E. Fletcher, the Chief Engineer of the Manchester Steam Users' Association, was called in to inspect it and advise about ten other engines of a similar build. The following is an extract from his report:

"It is no easy matter to learn the quality of plates when worked into a boiler, and the only course I can suggest is that the other boilers should be stripped and most carefully examined, added to which they should be tested with water

up to a pressure of twice that at which they are usually worked. It must not, however, be a 'blind' test. The boilers must be carefully watched while under pressure, not only with regard to leakage, but also with regard to the movement of the parts. For this purpose accurate measurements should be taken. The hydraulic test should be a sustained one. It should not be kept on for a few minutes only, but for half an hour or more."

It should be kept in mind though, that while a hydraulic or pressure test is very useful and effective, it does not give infallible evidence of the safety or condition of a boiler to which it is applied. The danger is that wherever it is used it will be depended upon to the exclusion or neglect of thorough inspection and examination of boilers. It should be impressed in the strongest possible way that a hydraulic or pressure test must not be relied on entirely. Cases have occurred of boilers which have been subjected to a pressure test without showing any weakness, and which have exploded soon after. There is a class of defects which a pressure test may reveal, and which could not be discovered by inspection. Among these are dangerous corrosion in inaccessible places, broken stay-bolts and braces, cracked and defective plates, etc. There is, however, another kind of defect which a pressure test will not reveal, and which can only be discerned by the most rigid internal and external examination. A pressure test should in no way supplant inspection, nor inspection the pressure test, but the two should go together.

But our article is again extending its limits of length and the further consideration of the subject must be postponed.

THE WINTER GRAIN MOVEMENT.

The movement of grain in winter, and especially its distribution among exporting cities, is always interesting, because then the competition is between the several railroads and not between the railroads and the lake and canal route. In winter alone are we able to judge as to the relative ability of the several railroads and the several cities to attract this important traffic. Generally for seven months of the year the Erie Canal is the cheapest route for grain, and brings New York more than is carried by any railroad to any place; then, too, Montreal is an important grain receiver and exporter, while during the other five months its harbor is closed and its receipts are insignificant.

But one of the chief reasons for studying the winter grain receipts particularly and by themselves is to trace the effect of the differences in the agreed rates to different Atlantic ports. Unfortunately, the irregularity of rates in all previous winters since these differences were agreed upon has prevented any trustworthy conclusion from the course of business on the effect of these differences. Every winter rates have been cut, and it was impossible to say at what average rates the grain was actually carried to any port. It has doubtless been the purpose, in the midst of the cutting, to preserve the agreed differences, but the party first in the field to make reductions has controlled that to a great extent. Philadelphia might be receiving at four instead of two cents less than New York rates, or New York at Philadelphia rates instead of two cents less, for a considerable period before rates would be cut by all parties so as to restore the agreed differences.

This year, however, rates, with but insignificant exceptions, have been fully maintained so far throughout the winter on the basis of 40 cents per 100 lbs. from Chicago to New York, with the agreed differences of three cents less to Baltimore and two cents less to Philadelphia. Moreover, the rates maintained are higher than have been received in the winter for several years, or indeed at any time of the year except for a few weeks in the fall of the last three years. Before 1874, it is true, rates were always higher in winter and usually were pretty well maintained, but the winter movement in those days was limited chiefly to the supplying of the domestic and largely of the interior Eastern demand for consumption; that is, not much grain was ever carried to sea-ports in the winter for export. This will be indicated by the following table of wheat receipts at New York during the five months that navigation is closed compared with those of the other seven months for 17 years, as given below:

Receipts of Wheat at New York.

	Five months, Dec. to April.	Seven months, May to Nov.	P. c. in winter.
1862.....	2,210,634	24,859,225	8.2
1863.....	1,560,163	16,392,045	8.4
1864.....	1,045,950	12,235,118	7.9
1865.....	857,616	7,817,213	9.9
1866.....	1,653,759	4,112,905	27.8
1867.....	886,704	8,820,040	9.1
1868.....	1,449,192	11,500,876	11.2
1869.....	2,531,657	21,420,593	10.5
1870.....	3,368,527	20,545,221	14.1
1871.....	1,988,707	24,775,260	7.5
1872.....	2,012,565	14,209,342	12.4
1873.....	4,532,950	30,091,981	13.1
1874.....	10,285,825	31,491,339	24.6
1875.....	4,923,518	29,445,999	14.2
1876.....	5,855,401	20,555,895	22.2
1877.....	2,812,454	22,042,445	11.3
1878.....	17,285,541	43,883,901	27.3

Before 1873, we see that there never had been so

much as 3,500,000 bushels received at New York in all five of the winter months; in 1878 the receipts of these months were more than 17,000,000 bushels and 27 per cent. of the whole. Even in 1873, which was a year of a wheat movement theretofore unprecedented, the average monthly receipts were but 907,000 bushels while navigation was closed, against 4,300,030 while it was open, and a little more than an eighth of the wheat arrived in winter. But first in 1874 a large proportion of a large wheat crop arrived during the five months when the canal is closed; and every year since when there has been much wheat to move, a large proportion of it has come forward in the winter. That there was a small proportion of total large receipts in these months in 1875 and 1877 is not a contradiction but a confirmation of this statement. The crop of 1874 was light, and there was consequently not much wheat to go forward in the first four months of 1875, and the same is true of the crop of 1876.

Moreover, the change at New York does not begin to show the total change in the winter movement, or in the proportion of the winter movement to the total movement, because, in the period before 1874 there were no considerable wheat exports except from New York and Montreal, while since Baltimore and Philadelphia have had a considerable share of this traffic.

Thus we are justified in the statement that there has been previously but one winter when there was a heavy movement of grain to the sea-board with rates as high as 40 cents per 100 lbs. The winter of 1873-74 there was a large and pressing foreign demand which forced grain forward at good rates. In the winter of 1877-78 there was the same kind of a foreign demand—one that could not wait till spring to be supplied—but the conflicts of the railroads caused the heavy movement to be made at low rates. The next winter the demand was as great, but not so pressing, but rail rates hardly left any temptation to hold grain. This winter there was a still larger crop to come forward, still greater foreign requirements to be filled, but, as the facts so far indicate, not so instant a demand; that is, foreign markets were not so bare in the fall as to compel the hastening forward of grain in the winter. This, then, has been a winter to test the practicability of remunerative winter rates under the present circumstances of the country. The fact that the receipts of the Atlantic ports, taken in the aggregate and including all kinds of grain, have been larger in December and January than for the corresponding months of any previous year shows conclusively that the rate is perfectly practicable and in no degree prohibitive, as doubtless some have feared, believing that a business which has largely grown up since 1874, and during a period when winter rates have not averaged much more than 25 cents, could not bear a much higher rate.

The receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and the receipts at the seven Atlantic ports, for the months of December and January have been, in bushels, for the past seven years.

	Northwestern Receipts.	Shipments.	Atlantic Receipts.
1873-74.....	26,325,261	12,010,012	17,859,573
1874-75.....	13,084,498	6,763,860	13,572,890
1875-76.....	20,913,672	9,295,390	15,838,748
1876-77.....	20,368,292	8,090,745	16,422,084
1877-78.....	23,365,040	13,536,554	28,555,582
1878-79.....	29,531,539	12,437,046	24,969,849
1879-80.....	33,022,151	10,743,373	28,823,286

Thus, in spite of all that has been said about high rail rates, speculation and the holding back of grain, we find that this winter's movement is still the largest on record—the receipts of Northwestern markets 12 per cent. greater and of Atlantic ports 15½ per cent. greater than last year. The decrease in shipments from Northwestern markets tells nothing against this, but rather in its favor, as it shows that the receipts at the seaboard have been chiefly different grain from the receipts at Northwestern markets, while if the latter's shipments had been large, they would be in great part the same grain.

The truth is, what has been called the dullness of the grain movement and the holding back of grain by speculators have been chargeable only to one of the grains, to wheat, which is truly just now the most important of the export grains, but affords but a fraction of the whole grain traffic—last January but 26 per cent. of the whole number of bushels arriving at the seaboard.

The through shipments of grain not first marketed at a Western lake or river port go on increasing, as is shown by the difference between Atlantic receipts and Northwestern markets' shipments. The excess of the former over the latter has been:

1873-74.....	5,849,561 bushels.
1874-75.....	6,809,000 "
1875-76.....	6,543,388 "
1876-77.....	7,432,239 "
1877-78.....	15,019,028 "
1878-79.....	12,532,203 "
1879-80.....	18,079,913 "

The receipts at the seven Atlantic ports for the same two months have been:

	1876-77.	1877-78.	1878-79.	1879-80.
New York.....	5,724,266	11,413,141	10,029,271	11,090,441
Boston.....	1,575,637	2,182,413	2,023,851	2,621,318
Portland.....	301,242	442,446	318,012	804,644
Montreal.....	41,615	40,855	34,030	128,602
Philadelphia.....	3,437,500	6,731,235	5,193,250	3,362,810
Baltimore.....	4,867,100	6,205,500	5,813,800	6,049,483
New Orleans.....	694,936	2,540,392	1,558,235	3,871,929
Total.....	16,641,906	28,555,982	24,970,449	28,842,287

The aggregate receipts of the seven ports were thus 15½ per cent. greater this winter than last, 1 per cent. greater than in 1877-78, and 73 per cent. greater than in 1876-77—a little larger this year than ever before. Compared with last year, there are increases everywhere, except at Philadelphia, where there is a decrease of no less than 35 per cent. Compared with 1877-78, when the aggregate receipts were nearly the same as this winter, there are increases at New York, Boston, Portland, Montreal and New Orleans, balanced by a large decrease at Philadelphia and a small one at Baltimore. All but the two places last named have larger receipts this winter than in the corresponding two months of any preceding year. Philadelphia has smaller receipts than in 1876-77 even, though the aggregate receipts of the seven ports are 73 per cent. greater than then. The greatest increase is shown by New Orleans, and more than one-fourth of its receipts for the two months were in the last week of the nine.

The percentage of the total receipts received at each port in each of the four years has been:

	1876-77.	1877-78.	1878-79.	1879-80.
New York.....	34.4	40.6	40.1	41.0
Boston.....	9.5	7.6	8.1	9.1
Portland.....	1.8	1.5	1.3	2.8
Montreal.....	0.2	0.2	0.1	0.4
Philadelphia.....	20.6	20.1	20.8	11.7
Baltimore.....	29.3	21.7	23.2	21.0
New Orleans.....	4.2	8.9	6.4	13.4
Total.....	100.0	100.0	100.0	100.0

New York, Portland, Montreal and New Orleans have larger percentages of the business this winter than in any of the previous winters; Philadelphia and Baltimore smaller ones—the former very much smaller.

Comparing New York with Philadelphia and Baltimore taken together, we have:

	1876-77.	1877-78.	1878-79.	1879-80.
New York.....	34.4	40.6	40.1	41.0
Philadelphia and Baltimore.....	49.9	41.8	44.0	32.7
The three cities.....	84.3	81.8	84.1	74.3

The great falling off of the last two cities is thus chargeable only to a slight extent to New York, which has gained since last year only one-seventh of what they have lost. In every year before, Philadelphia and Baltimore together have received more grain than New York; this year New York has received a quarter more than the two together.

Comparing New York and Boston taken together with Philadelphia and Baltimore together we have:

	1876-77.	1877-78.	1878-79.	1879-80.
New York and Boston.....	43.9	47.6	48.2	50.7
Philadelphia and Baltimore.....	49.9	41.8	44.0	32.7
The four cities.....	63.8	60.4	62.2	63.4

Not one-fourth of the loss of the two Southern ports has been gained by the two Northern ones, and the greater part of it is chargeable to the gain of the southernmost port of all—New Orleans—whose proportion has risen from 6.4 to 13.4 per cent. of the whole.

With the rates maintained as they have been this year, and the great pressure of grain at lake ports, which has so filled the elevators that some of the Western roads have been compelled to refuse grain or leave it in cars on side-tracks in default of storage room, there has been more than the usual inducement to search out and utilize the cheapest route to the seaboard. The only irregularities in rates that have been complained of are reductions by the Grand Trunk on export rates by way of Portland and Boston, and these reductions, for the few weeks that they were made, seem to have had a very decided effect on the receipts of Portland and Boston. The movement by New Orleans is wholly beyond the control of the railroads, and the receipts of that port are doubtless chiefly by barges down the Mississippi, which of course have a much better chance to succeed when the rail rate from St. Louis is 46 cents, as it has been this winter, than when it is 20 or 25 cents, as at this time last year. Heretofore New Orleans has offered no competition for the grain export trade worth taking into consideration, and the mouth of the Mississippi has been open so long that it is reasonable to suppose that a large business would have grown up by this route before this time if it could have been made profitable in competition with the rail-rates that have prevailed previous to this year. It cannot be denied, however, that there is a very much greater chance of success for barge lines on the Mississippi and grain-carrying vessels from New Orleans, with rail rates to the sea-board as high as they are this winter,

than there has been before since the winter of 1878-79—that is, since the improvement of the mouth of the Mississippi. The shipments by this route so far this winter can hardly be called large, it is true; but then it must be remembered that some preparations are necessary before a large business can be done advantageously by this route, special boats being required, it appears, for carrying grain in large quantities on the river. If, however, the maintenance of a 40-cent rate throughout the winter does not lead to preparations for the utilization of the river route to the utmost, then there is little prospect that any considerable proportion of the Northwestern exports of grain will be made by this route.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Atchison, Topeka & Santa Fe.—The Santa Fe Branch is completed from Canoncito, N. M., to Santa Fe, 18 miles.

Little Rock, Mississippi River & Texas.—The Western Division is extended from Collins, Ark., west to Monticello, 16 miles.

Nevada Central.—Extended southward to Austin, Nev., 10 miles, completing the road. Gauge, 3 feet.

This is a total of 44 miles of new railroad, making 220 miles reported thus far in 1880.

NEW ORLEANS GRAIN RECEIPTS were much the largest ever known during the week ending Jan. 31 last, when they amounted to 1,120,063 bushels, which is nearly as much as during the four weeks previous, and more than its average monthly receipts in previous years. The time seems extraordinarily favorable for exports by way of New Orleans. Not only is the rate from the West to Eastern ports higher than before for a long time, but an unusually large proportion of the grain is pretty well to the South, in the Ohio valley, etc. Then the crowded condition of elevators at lake ports has made it impossible for some Western railroads to deliver at them; their cars could not be unloaded. Then, too, the ocean rate has been so extremely low that the usual proportion in favor of New York or Baltimore is but a small amount. If the New Orleans rate is double the New York rate, it makes a great difference whether the latter is 3d. per bushel or 8d. It is even less than 3d. now. It would seem that New Orleans exports should be developed now if ever; the circumstances are hardly likely to be so favorable again. If shipments had been large by that route throughout December, probably rail rates to the East would have been forced down by the first of January, instead of being maintained till the end of February or longer. Hitherto the shipments by New Orleans have been very irregular and spasmodic. A great tow of barges will take down an immense quantity at once, and then for months receipts are as light as ever. There have been but four weeks previous to this in which as much as half a million bushels has been received at New Orleans, and these have been as follows:

Week ending.	
Feb. 9, 1878.	735,165 bushels.
" 10, "	61,445 "
March 22, 1879.	608,008 "
Dec. 20, "	718,270 "

In 1878 and 1879 winter rates were so extremely low by rail to the East that it may well have seemed hardly worth the while to open new routes; but this year, with rail rates well maintained, and ocean rates extremely low, and an enormous surplus of grain awaiting export, it is surprising that more has not been done.

THE REAGAN BILL, concerning which the House Committee on Commerce has heard many arguments this winter, the Committee last Tuesday voted not to report, the vote standing 7 to 8. Afterward a motion to reconsider was adopted, but a telegram says that this was for the purpose of substituting for the Reagan bill proper another, providing for a national railroad commission. The Reagan bill itself is an irrational measure, forbidding acts of the highest utility to the interests of the public as well as the railroads. But the objects, at least the chief objects, which are aimed at by the supporters of this bill, the railroads themselves are anxious to secure. That is, they wish to avoid the great differences in rates which are practically avoidable, because they lose immensely by them. If the bill aimed to reduce their profits, of course they would object; but it did not do that directly.

NEW PUBLICATIONS.

Homans' Bankers' Almanac and Register for 1880, besides the matter heretofore given, namely, full lists of national and state banks and private bankers of every place in the United States, and of their presidents, cashiers and capital, and New York correspondents, of savings banks, trust companies, etc., banks and bankers in Canada and in the principal European and other foreign cities, with interest laws, etc., has a "Legal Directory," consisting of a list of attorneys in the United States, each of whom has been recommended by some bank or banker, whose name is given as reference with the lawyer's name. It is a volume of 342 octavo pages, and has been a recognized book of reference for many years, this being the thirtieth issue.

The *Revue générale des chemins de fer* for November copies from the *Revue universelle des mines* a translation of Mr. C. B. Dudley's report on the chemical composition and physical properties of Bessemer steel rails, and a copy of the official drawing of the standard car-axle, adopted by our Master Mechanics' and Master Car-Builders' associations.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
International & Great Northern, special meeting in Palestine, Texas, March 8, for the purpose of ratifying and approving action already taken toward organizing the company; of accepting the transfer of the road from the trustees, and of authorizing a first mortgage for \$5,624,000 and a second mortgage for \$4,724,000 on the road.

Dividends.

Dividends have been declared as follows:
Cleveland & Pittsburgh (leased to Pennsylvania Company), 1% per cent., quarterly, payable March 1.
Montpelier & Wells River, 2 per cent., payable on demand.
Chicago & Alton, 3% per cent. on preferred and 3 per cent. on common stock, both semi-annual, payable March 1.

Foreclosure Sales.

The *Tuckerton Railroad* was sold in Camden, N. J., Feb. 11, under a decree of foreclosure granted by the United States Circuit Court, and bought for \$85,000 by the Solicitor of the company. The road is 31 miles long, from Whiting Junction, N. J., through Tuckerton to Beach Haven, and had \$400,000 first-mortgage bonds.

Land Grant Commissioners' Association.

This Association met at the Grand Pacific Hotel in Chicago, Feb. 4. The following representatives were present: S. J. Gilmore, of the Kansas Pacific and Denver Pacific; W. S. Johnson, Atchison, Topeka & Santa Fe; W. A. Kimball, St. Louis, Iron Mountain & Southern; Peter Daggy, Illinois Central; James B. Power, Northern Pacific; Leavitt Burnham, Union Pacific; A. M. Somers, Missouri, Kansas & Texas; Thomas D. Price, Hannibal & St. Jo.; W. S. Hall, St. Paul & Sioux City; D. A. McKinlay, St. Paul, Minneapolis & Manitoba.

Mr. W. S. Johnson presided and Mr. E. H. Talbot acted as Secretary.

The chief business of the meeting was the discussion of a pamphlet prepared by the Secretary setting forth the wisdom of the land-grant system and the advantages derived from it by the country.

Resolutions were adopted deprecating any change in the existing laws relating to the survey and disposition of the public lands. The meeting then adjourned.

St. Louis Passenger Agents' Meeting.

A special meeting of general passenger agents was held in St. Louis, Feb. 9, to consider charges made that the Vandalia Line was cutting rates and evading the agreement between the St. Louis lines. After thorough investigation, the meeting resolved that the charges were unfounded.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—The following circular is dated Jan. 20:

"Mr. John P. Whitehead having been appointed General Auditor of this company, with headquarters at Boston, Mr. Ernest Young will assume the duties of Auditor at Topeka, Feb. 1. Until otherwise directed, all communications and reports, heretofore addressed to Mr. Whitehead, will be forwarded to Mr. Young, at Topeka." Mr. Whitehead was several years Auditor of the Rockford, Rock Island & St. Louis, and first went to Kansas, we believe, as Auditor of the "Colorado pool."

Atlantic & Pacific.—The following have been appointed as trustees to hold the stock of this company in trust for the Atchison, Topeka & Santa Fe and the St. Louis & San Francisco companies: Warren Sawyer, Henry P. Kidder, Boston; Thomas A. Stuart, New York.

Bedford, Springville, Owensboro & Bloomfield.—Mr. J. W. Kennedy has been appointed Superintendent, in place of E. Hurlburt, who has gone to Texas. Mr. Kennedy was recently Road-Master of the Jeffersonville, Madison & Indianapolis.

Boston, Barre & Gardner.—At the annual meeting in Worcester, Feb. 4, the following directors were chosen: George S. Barton, Calvin Foster, S. R. Heywood, M. V. B. Jefferson, F. H. Kelley, W. W. Rice, Stephen Salisbury, Jr., Worcester, Mass.; Charles Heywood, Levi Heywood, Gardner, Mass.; Isaac N. Ross, Holden, Mass.; Nelson D. White, Winchendon, Mass.

Chicago & Pacific.—At the annual meeting in Chicago, Feb. 3, the following directors were chosen: George S. Bowen, Milo Byington, Joel D. Harvey, A. B. Hazleton, Charles D. F. Smith, F. A. Winkelman, George Youngs. Messrs. Byington, Harvey, Hazleton and Youngs are new directors, succeeding A. F. Brown, Abraham Gale, L. P. Hilliard and E. C. Lovell. The board elected George S. Bowen President; Charles D. F. Smith, Vice-President and General Solicitor; A. B. Hazleton, Secretary; Joel D. Harvey, Treasurer.

Chicago & Northwestern.—Mr. John Dolan has been appointed Road-Master of the Menominee River Branch. He has been conductor of a construction train on the Peninsula Division for some years.

Chicago, Burlington & Quincy.—The following circular announces an appointment anticipated for some time, as we have heretofore noted:

"Mr. Henry B. Stone, Division Master Mechanic, has been appointed Superintendent of Locomotive and Car Departments of this company, with office at Aurora. To take effect Feb. 1."

Mr. Stone has been for some time Master Mechanic of the Chicago Division, and is considered an exceptionally able and successful officer.

Cumberland, Moorefield & Petersburg.—This company has been organized with the following officers: President, J. H. Percy; First Vice-President, John A. Robinson; Second Vice-President, James Johnson.

Fitchburg.—The following circular is dated Feb. 5:

"Mr. S. W. Cummings is appointed General Passenger and Ticket Agent of this company, vice Mr. B. McChan, General Passenger Agent (Fitchburg and Troy & Boston railroads), resigned, and Mr. C. C. Daggett, General Ticket Agent, transferred to other duties. His office will be in the passenger depot of the company, Boston, Mass. Appointment takes effect March 1, 1880."

Ft. Wayne & Jackson.—The full list of officers of this company, successor to the Ft. Wayne, Jackson and Saginaw, is as follows: President, Samuel Sloan; Secretary and Treasurer, Roswell G. Rolston; General Superintendent, M. D. Woodford; General Freight and Passenger Agent, H. Brumley; Master of Transportation, W. B. Beamer; Auditor, E. B. DeVoe. The offices are in Jackson, Mich., except those of the President and the Secretary and Treasurer, which are in New York.

Framingham & Lowell.—At the annual meeting in South

Framingham, Mass., Feb. 6, the following directors were chosen: S. N. Aldrich, James W. Clark, John Fletcher, Jr., D. E. Harding, Edward Hastings, E. D. Hewins, J. R. Kendrick, Jacob Nichols, S. B. Rogers. The road is leased to the Old Colony.

Hoosac Tunnel Route.—Mr. Silas W. Cummings has been appointed General Passenger and Ticket Agent, from March 1, of this line, made up of the Fitchburg, the Troy & Greenfield and the Troy & Boston roads. Mr. Cummings is well known in Boston, having been connected with the Vermont Central line, under Mr. Lansing Millis, for many years. For the past four years he has had charge of the ticket department of the Central Vermont and its branches at St. Albans.

Indianapolis & St. Louis.—Mr. D. M. Kendrick has been appointed General Passenger Agent in place of C. C. Cobb, resigned.

Jacksonville, Pensacola & Mobile.—Mr. Edgar Vliet, General Freight and Ticket Agent, is appointed Master of Transportation also.

Kansas City, St. Joseph & Council Bluffs.—Mr. J. E. Smith has been appointed General Freight Agent. He has been for some years agent in Kansas City.

Kingston & Pembroke.—At a meeting held in Kingston, Ont., Feb. 11, the following new directors were chosen: G. W. Flower, Watertown, N. Y.; J. Tillinghast, Albany, N. Y.; H. H. Porter, Chicago; R. P. Flower, New York.

Lake Shore & Michigan Southern.—Gen. M. F. Donahoe, of Boston, has been appointed New England Traveling Agent.

Little Miami.—The old officers have been reelected as follows: President, Hugh J. Jewett; Vice-President, Henry Hanna; Secretary, Julius Dexter; Treasurer, S. E. Wright. The road is leased to the Pittsburgh, Cincinnati & St. Louis.

Manhattan Elevated.—Mr. T. F. Onderdonk has been appointed Superintendent Western Division; Charles P. McFadden, General Ticket Agent; Robert I. Sloan, Assistant Engineer; Charles O. Richards, Road-Master.

Manitoba Southwestern.—At the annual meeting in Winnipeg, Manitoba, Feb. 4, Messrs. Ashdown, Bown, Hackett, Kennedy, Lyon, Murdoch, McGregor, Schultz and Young were chosen directors. The board elected Col. Kennedy President; Mr. Ashdown, Vice-President; Mr. Young, Secretary and Treasurer.

Marietta & North Georgia.—Capt. J. C. Turner has been appointed Chief Engineer. He formerly held the same position on the Northeastern, of Georgia.

Milwaukee & Dubuque.—At the annual meeting in Milwaukee, Jan. 31, the following directors were chosen: H. M. Benjamin, George H. Noyes, Milwaukee, Wis.; A. Cox, Warren N. Dalrymple, Sugar Grove, Wis.; Oliver Dalrymple, St. Paul, Minn.; Wm. F. Dalrymple, Pittsburgh, Pa. The board elected H. M. Benjamin, President; Oliver Dalrymple, Vice-President; Wm. F. Dalrymple, Secretary and Treasurer.

Minneapolis, Shakopee & Minnesota Valley.—The directors of this new company are as follows: D. L. How, Shakopee, Minn.; James Clark, P. F. Richie, C. B. Terrill, Eden Prairie, Minn.; Wm. Chadwick, H. D. Cunningham, S. Ellingson, F. Peteler, Bloomington, Minn.; Charles H. Clark, H. Wilson, Richfield, Minn.; G. A. Burbank, Thomas Lowry, John McMullen, Minneapolis.

Missouri Pacific.—Mr. A. W. Dickinson has been appointed Assistant General Superintendent. He was formerly on this road and later General Superintendent of the Galveston, Harrisburg & San Antonio.

Morris & Eastern.—The officers of this new company are: President, Charles H. Gould; Vice-President, L. B. Ray; Secretary, P. A. Armstrong. Office at Morris, Ill.

Nevada Central.—At a recent meeting the directors voted to abolish the office of General Manager, and appointed Richard Amerman Superintendent. Office at Battle Mountain, Nevada.

New London Northern.—At the annual meeting in New London, Conn., Feb. 5, the old board was reelected as follows: Wm. H. Barnes, Wm. W. Billings, Augustus Brandagee, Robert Coit, Benjamin Stark, New London, Conn.; Charles Osgood, Norwich, Conn.; Thomas Ramsdell, Windham, Conn.; James A. Rumrill, Springfield, Mass.; G. N. Harris, Wm. H. Hill, Boston; Wm. Allen Butler, New York. The road is leased to the Central Vermont. The board reelected Charles Osgood, President; Robert Coit, Secretary and Treasurer.

New York, Ontario & Western.—The board of directors of this company, successor to the New York & Oswego Midland, has been reorganized and is now made up as follows: Jose F. Navarro, Charles J. Canda, Julius Hallgarten, Wm. C. Whitney, Samuel S. Strang, E. L. Frank, Wm. L. Thess, Conrad N. Jordan, Theodore Houston, G. Burnham, N. Farley, New York; Charles S. Hinchman, Philadelphia.

Pennsylvania Canal.—At the annual meeting in Philadelphia, Feb. 11, Isaac J. Wistar was chosen President, with the following directors: Thomas A. Scott, George B. Roberts, Isaac J. Wistar, Josiah Bacon, Wistar Morris, M. Hall Stanton, Samuel M. Felton, Strickland Kneass, A. J. Cassatt, Alexander Biddle, Simon Gratz, William Eisenbrey.

Philadelphia & Erie.—At the annual meeting in Philadelphia, Feb. 9, the following directors were chosen: Alexander Biddle, J. N. DuBarry, Strickland Kneass, Wistar Morris, Henry M. Phillips, N. Parker Shortridge, Robert Thompson, Samuel Gustine Thompson, Henry D. Welsh, John P. Wetherill. Messrs. Phillips and Welsh are new directors, succeeding John Noblit and J. Alexander Simpson. The road is leased to the Pennsylvania Railroad Company.

Pomeroy & State Line.—This company has been organized as successor to the Pennsylvania & Delaware, with the following officers: President, Strickland Kneass; Directors, Hugh W. Catherwood, Terence H. Clark, Wistar Morris, Dell Noblit, George B. Roberts, Edmund Smith; Secretary and Treasurer, James R. McClure. It is leased to the Pennsylvania.

St. Johnsbury & Lake Champlain.—The directors of this company, organized to succeed the Portland & Ogdensburg, Vermont Division, are as follows: Bradley Barlow, Thomas Coggeshall, Franklin Fairbanks, Horace Fairbanks, Lewis Fitzgerald, George W. Hendee, A. B. Jewett, John J. McCook, Wm. H. Rhawn.

Schuylkill Navigation.—At the annual meeting in Philadelphia, Feb. 10, the following were chosen: President, Frederick Fraley; Managers, John N. Hutchinson, Charles W. Wharton, George Brooke, Charles Raber, Michael Ward, Thomas R. Patton; Treasurer and Secretary, Richard Wilkins.

Silver Lake.—At the annual meeting, Jan. 17, the follow-

ing officers were chosen: President, Samuel L. Chapin; Vice-President, George Tomlinson; Secretary, Rufus H. Stedman; Treasurer, Henry N. Page.

Southeastern, of Canada.—The office of Auditor having been abolished, all communications relating to freight, passenger and car service accounts, also the general accounts of this road should, on and after Feb. 1, 1890, be addressed to Wm. B. Hatch, Chief Clerk, No. 202 St. James street, Montreal.

Summit Branch.—At the annual meeting in Philadelphia, Feb. 11, the following directors were chosen: George B. Roberts, A. J. Cassatt, Strickland Kneass, Wistar Morris, N. P. Shortridge, J. N. DuBarry, Edmund Smith, J. P. Jones.

The same directors were chosen at the same time for the *Lykens Valley* and the *Mineral Railroad & Mining Company*.

Toledo, Peoria & Western.—At a meeting held in Peoria, Ill., Feb. 4, the following directors were chosen: John Crear, H. De Coppel, M. A. Dumont, Wm. Hill, W. S. Hill, A. L. Hopkins, A. J. Leith, W. F. Merrill, James F. Secor. The company is successor to the Toledo, Peoria & Warsaw.

United New Jersey.—The Legislature of New Jersey has re-elected Charles A. Butts, of Burlington, State Director.

Union Pacific.—The following circular is dated Feb. 1, 1890:

"The Union Pacific Railroad Company, the Kansas Pacific Railway Company, and the Denver Pacific Railway Telegraph Company having been consolidated, the railroads heretofore owned and operated by said companies will, from and after this date, be operated under the name of the 'Union Pacific Railway Company,' and under the management and control of S. H. H. Clark, General Manager, at Omaha, Neb.

"The books and accounts of the Treasury Department will be in charge and control of H. McFarland, Treasurer, at Boston, Mass.

"The books and accounts of the Operating Department, including those of the passenger and freight business, will be in charge and control of J. W. Gannett, Auditor, at Omaha, Neb.

"Mr. James T. Clark has been appointed General Superintendent of the Union Division, covering the line from Council Bluffs, Iowa, to Ogden, Utah, and branches thereof, with office at Omaha, Neb.

"Mr. S. T. Smith has been appointed General Superintendent of Kansas Division, covering the line from Kansas City, Mo., to Cheyenne, Wyoming, and branches thereof, with office at Kansas City, Mo.

"The passenger business of all divisions and branches will be conducted under direction of Thos. L. Kimball, General Passenger and Ticket Agent, at Omaha, Neb.

"The freight business of all divisions and branches will be conducted under direction of E. P. Vining, General Freight Agent, at Omaha, Neb."

Union Railroad, Transfer & Stock Yards Co.—This company, better known as the Indianapolis Belt, at its annual meeting, Feb. 3, in Indianapolis, re-elected the old board, as follows: E. F. Claypool, M. A. Downing, C. C. Gale, W. C. Holmes, W. R. McKen, John F. Miller, Horace Scott, John Thomas, George B. Wright. The board re-elected W. R. McKen President; Horace Scott, Vice-President; E. F. Claypool, Secretary and Treasurer.

Western & Atlantic.—At the annual meeting in Atlanta, Feb. 5, the old officers were re-elected, as follows: Gov. Joseph E. Brown, President; Col. E. W. Cole, Vice-President; Gen. William McRae, General Manager; Col. W. C. Morrill, Secretary and Treasurer.

West Jersey.—At the annual meeting in Camden, N. J., Feb. 11, the following directors were chosen: George B. Roberts, Thomas Jones Yorke, Lewis Mulford, Coleman F. Leaming, Charles E. Elmer, John M. Moore, Josiah Bacon, Strickland Kneass, Thomas H. Dudley, George Wood, J. N. Du Barry, N. Parker Shortridge, Thomas H. Whitney.

PERSONAL.

—Not many railroad companies have two prospective Presidential candidates among their directors; but Hon. John Sherman and Hon. Samuel J. Tilden both have seats in the board of the Pittsburgh, Ft. Wayne & Chicago Company, and both are generally punctual in attendance at meetings and have served on committees together.

—Gen. Thomas L. Rosser, late Acting Chief Engineer of the Northern Pacific, has taken a contract to build 61 miles of narrow-gauge road out of Minneapolis.

—Mr. J. P. Laird has resigned his position as Superintendent of the Jacksonville, Pensacola & Mobile road.

—Mr. A. W. Hall, Road-Master of the Northern Division of the Chicago, Milwaukee & St. Paul, died very suddenly Feb. 4, at Horicon, Wis., dropping down while apparently in excellent health.

—Mr. C. C. Cobb has resigned his position as General Passenger Agent of the Indianapolis & St. Louis road, to accept a position on the Missouri, Kansas & Texas.

—Hon. A. E. Borie, a large stockholder and for many years a director of the Philadelphia & Reading Company, died in Philadelphia, Feb. 6, in the 71st year of his age. He was of French descent, but was born in Philadelphia and was for many years a prominent and active merchant of that city. In 1869 he was appointed Secretary of the Navy by President Grant, but held that position but a few months, the duties proving too heavy for his advanced age and failing health.

—Thirty-seven years ago 18 gentlemen met and subscribed a small sum of money to pay the expenses of surveying a railroad line from Plymouth, Mass., to Quincy. This was the beginning of the Old Colony Railroad, and of the subscribers to the fund only one now survives—Mr. R. B. Bradford, of Kingston. Another one, Hon. Jacob H. Loud, died last week.

—Mr. B. McChan has resigned his position as General Passenger Agent of the Hoosac Tunnel route.

—Mr. R. E. Ricker, formerly Superintendent and Engineer of the New Jersey Central and later of the New York Elevated road, has accepted the position of General Manager of the Gilbert & Bush Car Works at Troy, New York.

TRAFFIC AND EARNINGS.

Chicago Shipments Eastward.

Shipments for the week ending Feb. 7 were 34,817 tons, against 40,416 the previous week. At the end of the last week the Michigan Central had carried 16,982 tons more than its proportion, the Pittsburgh, Fort Wayne & Chicago 3,384 tons more, while the other roads were behind as follows: Lake Shore & Michigan Southern, 16,212 tons; Baltimore & Ohio, 3,839; Pittsburgh, Cincinnati & St. Louis, 315.

Of the 34,817 tons shipped in the first week of February 2,600 tons were flour, 19,652 tons grain, and 12,583 tons

provisions. This leaves less than 100 tons of all other freights.

Railroad Earnings.

Reports of earnings for various periods are received from the following roads:

Year ending Dec. 31:	1879.	1878.	Inc. or Dec.	P. c.
Chicago & Pacific.....	\$186,034	\$189,341	D.	\$3,307 1.7
Net earnings.....	34,890	74,282	D.	39,392 53.0
Mobile & Montgomery.....	703,407	679,280	I.	24,127 3.6
Month of November:				
St. John & Maine.....	\$8,058	\$9,092	D.	\$1,034 19.4
Net earnings.....	1,361	2,419	D.	1,058 44.1
Month of December:				
Ala. Great Southern.....	\$53,478	\$38,555	I.	\$14,923 38.7
At. & Gt. Western.....	400,853	288,542	I.	112,311 35.9
Eastern.....	217,803	175,672	I.	42,221 24.0
Mobile & Montgomery.....	82,580	88,648	D.	6,068 6.8
Og. & Lake Champlain.....	42,397	4,045	I.	8,127 200.0
Net earnings.....	12,172	4,045	I.	8,127 200.0
Month of January:				
At. Top. & Santa Fe.....	\$473,500	\$314,732	I.	\$158,768 50.4
Bur. Cedar Rap. & No.....	117,362	117,362	I.	60,994 57.0
Chicago & Alton.....	502,285	343,737	I.	158,548 46.1
Chi. & Eastern Ill.....	72,468	68,167	I.	4,300 6.3
Chi. Mil. & St. Paul.....	763,000	591,175	I.	171,825 29.1
Chi. & Northwestern.....	1,135,000	1,008,321	I.	126,679 12.5
Chi. St. Paul & Minn.....	83,642	73,870	I.	9,772 13.2
Flint & Pere Marquette.....	109,062	77,412	I.	32,580 42.1
Grand Trunk.....	730,066	689,321	I.	40,745 5.9
Great Western.....	351,245	306,098	I.	45,147 14.7
Han. & St. Joe.....	169,380	137,047	I.	32,333 22.6
Ill. Central, Ill. lines.....	417,236	475,891	D.	58,655 12.3
Iowa lines.....	119,421	104,301	I.	15,120 14.5
Int. & Gt. Northern.....	158,659	161,818	I.	3,159 1.9
Little Rock & Ft. Smith.....	49,856	25,078	I.	24,838 90.4
Net earnings.....	31,114	8,613	I.	22,501 261.5
Mo., Kansas & Texas.....	367,327	194,453	I.	172,874 88.9
Mobile & Ohio.....	246,501	194,486	I.	52,015 26.7
N. Y. Central & Hudson River.....	2,593,613	2,024,812	I.	568,801 28.1
St. L., A. & T. H., Bellville Line.....	51,270	48,445	I.	2,825 5.8
St. L., Iron Mt. & So.....	552,615	334,029	I.	218,586 65.4
St. L. & San. Fran.....	195,696	79,369	I.	116,327 146.5
St. Paul, Minn. & Manitoba.....	180,230
Tol. Peoria & W.....	93,306	94,907	D.	1,601 1.7
Wisconsin Valley.....	19,071	9,645	I.	10,026 103.9
Third Week in January:				
Min. & St. Louis.....	\$8,458	\$6,974	I.	\$1,484 21.2
Week ending Jan. 30:				
Great Western.....	\$79,459	\$89,023	D.	\$9,564 10.7
Week ending Jan. 31:				
Grand Trunk.....	\$200,027	\$186,507	I.	\$13,520 7.2

Grain Movement.

Receipts and shipments of grain of all kinds at the eight leading Northwestern markets, and receipts at the seven Atlantic ports, for the week ending Jan. 31, have been—in bushels—for the past seven years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874.....	2,408,458	1,073,518	2,111,715
1875.....	1,681,032	1,023,004	1,740,574
1876.....	2,109,285	1,041,550	1,960,365
1877.....	1,868,739	839,521	2,022,351
1878.....	2,520,392	2,272,058	3,798,653
1879.....	3,597,455	1,350,918	3,384,156
1880.....	3,652,141	1,571,994	2,371,989

The receipts at Northwestern markets for the week this year were very large, and have been exceeded but twice previously in any winter week—once four weeks before, and once in January, 1878, after a long mud blockade. Great complaints have been made of mud this year, and but for it probably receipts would have been considerably greater.

The shipments of these markets were the largest since navigation closed, and but moderate compared with shipments in the winter of 1878 and after January in 1879, when, however, rates were very low.

The receipts at Atlantic are the smallest for more than a year, though very nearly the same as in the previous week, but the receipts at what are usually the three leading ports were excessively small.

Of the receipts at Northwestern markets, Chicago had 38.7 per cent., St. Louis 35.1, Peoria 10, Milwaukee 6.6, Toledo 6.2, Detroit 0.3, and Cleveland 0.1 per cent.—St. Louis' proportion being unusually large.

Of the receipts at Atlantic ports New Orleans had 47.2 per cent., New York 20.2, Boston 12.1, Baltimore 11.1, Philadelphia 8, Montreal 0.8, and Portland 0.6. We believe that never before have the receipts been largest at New Orleans. In this case not only are New York and Baltimore receipts unusually small, but New Orleans receipts are the largest ever known, and more than those of New York, Philadelphia and Baltimore together. New York's receipts have not been so small before since March, 1877; Philadelphia's but once since July, 1877, and Baltimore's not at all since the last date. On the other hand, New Orleans has only four times altogether received even as much as half a million within a week.

Coal Movement.

Anthracite coal tonnages for the month of January are reported as follows, the tonnage in each case being only that originating on the line to which it is credited:

	1880.	1879.	Inc. or Dec.	P. c.
Philadelphia & Reading.....	405,046	436,460	D.	31,414 7.2
Northern Central, Shamokin Div. and Summit Branch R. R.....	41,303	26,832	I.	14,471 54.0
Sunbury, Hazleton & Wilkes-Barre.....	1,146	2,034	D.	888 44.3
Central, of N. J., Lehigh Div.....	293,311	211,091	I.	82,310 39.0
Lehigh Valley.....	311,097	210,078	I.	101,029 48.3
Pennsylvania & N. Y.....	1,215	7,756	D.	6,541 83.9
Del., Lacka. & Western.....	278,904	253,844	I.	25,060 9.7
Del. & Hudson Canal Co.....	303,811	218,155	I.	85,656 38.3
Pennsylvania Coal Co.....	43,280	75,055	D.	31,775 42.4
State Line & Sullivan.....	3,023	4,985	D.	1,962 39.2
Total.....	1,982,646	1,446,200	I.	536,446 36.3

There are reports of an overstocked market and weakness in prices. The demand for furnaces and manufacturing is good, but domestic demand has been light, owing to the mild winter. An attempt to bull the market may be traced in obscure rumors of a possible strike of the miners.

Bituminous and semi-bituminous reports for the month are unusually late; only the following have been received:

	1880.	1879.	Inc. or Dec.	P. c.
Cumberland, all lines.....	143,485	61,367	I.	82,118 13.4
Huntingdon & Broad Top.....	19,432	11,003	I.	8,429 76.6
Byrd & Clearfield.....	198,548	110,902	I.	87,586 78.9
Barclay.....	38,907	26,758	I.	12,149 45.3
Total.....	400,372	210,030	I.	190,282 90.6

The increase in both Cumberland and Clearfield is very large. Coal shipments from Seattle, Wash. Ter., for five years past have been: 1879, 135,012 tons; 1878, 116,008; 1877, 102,333; 1876, 95,314; 1875, 67,106 tons.

Pacific Through Rates.

As heretofore announced, the Pacific Mail Steamship Com-

pany has made a large reduction in passenger rates between New York and San Francisco, and is now arranging a new freight tariff, which will also show a large reduction in rates. This action is taken in consequence of the failure to renew the contract under which the Union and Central Pacific companies paid the Pacific Mail a large subsidy as a condition for the maintenance of rates.

Cincinnati Grain Traffic.

The report of the Cincinnati Chamber of Commerce and Merchants' Exchange gives the following as the number of bushels of grain received and shipped at that city in the past two years:

	1879.	1878.	Increase.	P. c.
Receipts.....	11,263,275	11,105,697	97,578	0.9
Shipments.....	5,022,591	4,498,908	523,683	11.6
Shipments through Cincinnati.....	6,888,390	4,784,900	2,103,420	44.0

The amount to and through Cincinnati, which measures pretty nearly the movement over the railroads from the north and west to Cincinnati, was thus 18,151,595 bushels in 1879 against 15,950,597 in 1878, an increase of 14 per cent., and the total movement from Cincinnati (including through shipments) was 11,910,911 bushels, against 9,283,508, an increase of 2,627,403 bushels, or 28 per cent. Cincinnati has not hitherto been counted an important grain market, but the great increase of wheat production in the Ohio valley within the last few years tends to enlarge its business, though not nearly in proportion to the increase in production, because there is very little advantage in making an inland city, especially so far east, a point of transfer, and grain once in the cars is likely to go through to the place of consumption or to a lake or ocean port.

THE SCRAP HEAP.

Railroad Equipment Notes.

The Schenectady (N. Y.) Locomotive Works are building six engines for the Grand Trunk and have also an order, it is said, for the Texas & Pacific.

The Danforth Locomotive Works, at Paterson, N. J., last week shipped three engines, one for the Canada Central.

The National Tube Works Company has orders for a number of Mack injectors for new engines now building.

The Rogers Locomotive Works, at Paterson, N. J., have been shipping some engines to the St. Louis, Iron Mountain & Southern road.

The Terre Haute (Ind.) Car Works are building 100 stock cars for the Vandalia Line. They have contracts enough on hand to keep the works busy for six months.

The Marshall Car & Foundry Company has been organized to build car works at Marshall, Tex. It is intended to build large shops, thoroughly equipped with the best tools. Mr. Charles Cobb, of New York, is President, and Mr. John F. Dickson, late of Louisville, General Manager.

The Cincinnati, Hamilton & Dayton shops at Lima, O., are building 200 box cars, 33 ft. long.

The Pullman Car Works, at Detroit, are to build several narrow-gauge sleeping cars to run on the Denver & Rio Grande road.

Iron and Manufacturing Notes.

Williams, Long & McDonald, in Pittsburgh, are rolling a large number of iron plates for the Keystone Bridge Company.

Mount Hickory Furnace, in the Shenango Valley, near Sharpville, Pa., is now using anthracite coal as fuel. This action is taken on account of the unsettled troubles with coal miners in that region, and the uncertainty as to a regular supply of bituminous coal.

The Pennsylvania Iron Works, at Danville, Pa., lately operated by Waterman & Co., have been sold to the Philadelphia & Reading Coal & Iron Company. The purchase includes a furnace, rolling mill, foundry, machine shop and considerable real estate. The price is said to have been about \$500,000.

A new company, known as the Ohio Iron & Steel Company, has bought the old Lovellville Furnace, near Youngstown, O., which has been idle for seven years past. It is to be rebuilt and put in order at once.

Brown, Bonnell & Co., at Youngstown, O., are making extensive additions to their large rolling mill.

The Roane Iron Company, at Chattanooga, Tenn., is running its works full time to fill orders.

The Indianapolis Rolling Mill is rolling iron rails for the Louisville, New Albany & Chicago road.

Bridge Notes.

The Atlanta Bridge Co. has taken a contract to build a combination draw-span, 202 ft. long, over the Savannah River on the Port Royal & Augusta road.

The Cleveland Bridge & Car Works have contracted to build bridges over Bear Creek, Big Plain Creek and Big Sandy River in Kentucky for the Chatteroi Railroad.

The Keystone Bridge Co., of Pittsburgh, has a contract for a bridge over the Big Sandy River in Kentucky for the Elizabeth, Lexington & Big Sandy road.

The Passaic Rolling Mill Co., at Paterson, N. J., has taken a contract to build a mile of the Brooklyn Elevated road.

Mr. Charles Filtean, of Minneapolis, Minn., is building a Howe-truss draw-span 200 ft. long, over the Red River at Grand Fork, Dak., for the St. Paul, Minneapolis & Manitoba.

Prices of Rails.

Steel rails are quiet and unchanged with few sales reported. Quotations are \$85 per ton at mill.

Iron rails are active and some large sales are reported, at prices varying from \$68 to \$75 per ton at mill.

Old iron rails are dull and a little lower. Latest prices in Philadelphia are \$43 to \$44 per ton.

Tramps.

A freight train on the Bee Line road last night ran over and killed a tramp, who was stealing a truck ride, near Long-grette, O. There was nothing on his person from which his name or profession could be learned, save a bottle of whiskey.—*Indianapolis News*, Jan. 31.

Single Lines.

Tennysen spends hours on a single line. But that's nothing. We have known men who spent their whole lives on a single line. They were generally conductors.—*Philadelphia Bulletin*.

A Minnesota railroad was recently sold for \$10—and now a local paper says it would have offered \$12, if it had known in time. Thus it is that stockholders are made to suffer.

Commuters on a suburban road are always grumbling—but when you come to think about it, they generally have some cause to grumble.

Careless Loading.

Regular extra 36, David Bell conductor, met first extra 35 at Nobody's, about four miles west of Narrowsburgh at 11.33 Sunday night. As the trains were passing each other one end of a rail or bar of iron on a flat car on extra 35 was thrown partly off the car by the motion of the train far enough to tear out half of the cab of engine 376 on train 36. Owen Taffney, flagman, was sitting in the cab and had one of his legs badly broken. He was attended by Dr. Appley,

of Cochection, and then brought to Port Jervis. It is feared his leg will have to be amputated.

The engineer was George W. Wright. Had the rail struck the engine one foot higher, it is thought it certainly would have killed Taffney and the fireman, John Dowe. While the injured man was being cared for, engineer Wright took a torch and walked back about a mile, fearing that the rail might have been thrown to the track and thus cause a disaster to train 12, which was the next to follow.—*Port Jervis Gazette*, Feb. 3.

He Opened the Gate.

Among the crowd that surged forward toward the gates as the St. Louis express rumbled into the Central Depot last evening, was a little old woman dressed in black, with a little white face just visible beneath a rusty old bonnet and above a great comforter wound high around the neck. Jostled this way and that by the hurrying throng, she was about to pass through the gate, when the gateman stopped her by a motion of the hand and a demand for her ticket.

"I am not going away," she replied. "I didn't buy a ticket."

"Then you can't go through here: against orders, you know."

"But, sir, my son is coming, and—"

"Can't help it," was the hurried reply. "Stay here and he will come to you quick enough."

"Ah, sir, if he only would," was the reply, and the tremble in the little woman's voice arrested the impatient murmur of those behind: "Oh, sir, if he only would, but he died in Cleveland last week, and now they are bringing my boy home in a coffin. He was the only one I had—oh, thank you, sir."

The gate was thrown wide open, an unknown friendly hand assisted her on, and in a moment the sad face of the little old woman in black was lost in the crowd.—*Rochester Democrat and Chronicle*, Feb. 3.

Men and Horses on the Track.

"Well," put in Carpenter, "I have never killed a human being yet, but we can't tell how soon we will. The nearest I ever came to it was at the time I struck the tramp between Howells and Middletown. That was a good while ago, and as I was able to nearly stop before I reached him, I only gave him a light rap, so light that he only got a leg broken and a small scalp wound, both of which he soon got over after being taken to the county house."

"You know," Aba, the day I hoisted up George Haggerty's caboose several years ago and came near killing poor old George? Well," continued Jackey, "that wasn't much of an adventure, so I'll tell you what 'Tom' Wilmoth, who used to run on the Susquehanna Division, once told me about chasing for miles a herd of horses. He said he overtook them one day on a straight level stretch several miles long, and instead of being frightened off the track with the whistle and bell, up went their ears and straight ahead they bolted. Tom said he was traveling all of 30 miles an hour if not more. He had a light freight train, and of course was violating the rule of the road at that speed, but as he had to make a station ahead of a first-class train he had to skip along lively to do it. He couldn't slack up speed a bit, for if he did, he'd hold the first-class. So, with blowing every quarter minute, he kept on, with the horses on a clean run ahead of him. He said he ran on that flat stretch for miles and miles, and every little while the horses, as if angry at the wonderful speed he was making them to go, threw up their tails defiantly and kicked up their heels furiously, just like they invariably do in an open field when you run by them. Tom said it was truly wonderful how they kept ahead on the track for at least six miles, and only went off the track when a bridge was reached over which they could not go. Part of them went off on one side and the rest on the other side, and then he went on and telegraphed back to the nearest telegraph office to send out trackmen to put them off the track, if possible, before the express came along. Fortunately the express was a little late, and they were got out of the way in time. Tom also said, that the horses were as wet and white with foam as if they had been lathered with soap. He didn't believe that deer could do what those horses did, and he always recommended owners of running horses if they wanted to get railroad speed out of their runners, to frighten them good with a locomotive whistle and bell and they'll clean the deck."—*Honesdale (Pa.) Herald*.

Duty on Steel Rails.

The House Committee on Ways and Means devoted a large part of last week to hearing arguments on the question of reducing the duty on steel rails. Representatives of several companies appeared in favor of the reduction, and the chief argument was made by Mr. Henry V. Poor, of New York. Mr. Samuel M. Felton, of Philadelphia and Judge Emory A. Storrs represented the steel manufacturers in opposition. The bill under consideration fixes the duty at \$10 per ton, but it is said that no one favors that figure. Eight members of the committee are reported to favor a reduction from \$28 to \$14 per ton, while five oppose any change.

The Miller Platform and Coupler Patent.

In Washington, Feb. 6, the House Committee on Patents decided to report adversely on the application for an extension of the patent on the Miller platform and coupler, on the ground that the 17 years it has run is long enough, and that the patentee has received sufficient remuneration already.

Enigmas for Travelers.

This, from the *Burlington Hawkeye* is not very new, but good enough to bear repetition:

"I wish," the cross passenger said, "there could be a law passed prohibiting the use of blinding initials and delusive terms by railway corporations. Look at this, now: I read my ticket and it puzzles me; I gaze out of the window and the inscriptions on the box cars mystify me. Why do they paint things on their cars to distract the minds of travelers? See that car—'C. T. N. Y., Series A.' What do I know about it? What is the—"

"That's the 'Car Trust Company of New York,'" said the brakeman.

"And then what is 'A. M. C. T.' on the next car?" demanded the cross passenger, but the brakeman was gone.

"And what is a car trust company?" asked the passenger with the sandy goatee, adding that he'd like to find some good trust company that would trust him for a new ulster and a sealskin cap.

"There you go again," the cross passenger replied.

"What do I know about it? And see there, what is the E. & P. Dispatch? And—great guns," he added, with sudden enthusiasm, as we swept past a snow-white car, "look at that white car—white as a snow-drift, with 'Great Central Special Blue Line' painted on it! Blue line? And here, let me out; I want to walk; see on that box car, 'Weight, 21,205; Hoist.' Hoist? By George, do you mean to tell me that any corporation has the soulless cheek to ask any man to hoist a car that weighs 10 tons? The biggest man in America couldn't lift one end of it. I'd like to hoist the man who painted that on the car."

The Young Man Sold.

She was a beautiful girl, fair as the morning, handsomely

arrayed, little gloved hands that you would even like to have box your ears. Drawn by the irresistible fascination of his inviting eyes, she approached the masquerader, who made room for her beside him. Her eyes beamed on him in beauty only equalled by his own, her voice was sweeter than the song of the siren when she spoke to him. She had to speak to him, how could she help it?

"Sir," she said, and the music of her voice thrilled the car.

"Sir, is this seat engaged?"

He looked up at the vision of glowing cheeks and laughing eyes, marble brow and clustering curls, and he relented, even the masquerader's heart warmed toward the lovely girl, the latest victim of his manly charms.

"Oh, certainly not," he said, and his bow was a study of grace for the steam man. "Oh, certainly not; you are entirely welcome; I shall only be too happy—" "Then," cried the charmed victim, "mother, you can sit here beside this gentleman."

And an old woman, 73 if she was a day, with no teeth and only one eye, a small box, a big band-box in a bag, a green reticule and an umbrella, two paper bags and a piece of calamus root, tottered into the proffered seat and sat down, and piled her things into the young man's lap. And the girl, the beautiful girl, went and sat down beside the passenger with the sandy goatee, who was so bashful that he couldn't and didn't say a word to his companion all the way to Newark, and blushed to his ears every time the fat passenger winked at him.—*Burlington Hawkeye*.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—The branch line to Santa Fe, N. M., is completed, and regular trains will run to that town next week. The branch is 18 miles long, leaving the main line at Cañoncito.

Atlantic & Great Western.—It is announced that the purchasers of this road have concluded a compromise with the United States Rolling Stock Company. The new company is to buy all the equipment leased of the Rolling Stock Company, paying for it an amount which will be accepted in full settlement for all claims.

The following is a summary of the plan of reorganization as prepared by the London committee:

The committee consists of Sir George Balfour, Mr. Hugh Fraser Sandeman, Mr. H. Wollaston Blake, the Rev. J. Lockington Bates, and Mr. Charles E. Lewis. The reorganization scheme provides that the administration of the new company, which will be known as the New York, Pennsylvania & Ohio Railroad, shall be placed in the hands of a delegation of directors in London, who shall have full control of the expenditure and policy of the company. Five trustees are to exercise the voting power of the new stock until the third-mortgage bondholders receive 7 per cent. interest in cash during three years. Three of these trustees are to be chosen annually by a majority in value of the first-mortgage bondholders, one by the second-mortgage bondholders, and the fifth by the leased-line bondholders. All creations of new mortgages, except as provided for to carry out the reconstruction, and all leases of every nature must be assented to by a majority in value of the first and second-mortgage bonds. The leases and agreement for leases are to be modified in accordance with the provisions of the reorganization plan.

The new securities and stock of the reorganized company are to be issued upon the following basis: (1.) New first-mortgage 25-year bonds to bear 5 per cent. interest for the first 5 years and 7 per cent. thereafter, whatever portion of this that may not be earned to be payable in deferred warrants, to be capitalized in bonds of the same class; payment of interest to become absolute not later than July 1, 1886, until which time the right to foreclose the mortgage is suspended. These bonds are to be issued for the conversion of the existing first-mortgage bonds, reorganization stock, with 25 per cent. bonus and interest and for unpaid coupons. The amount of the reorganization stock is very small. (2.) Second-mortgage 30-year bonds, to receive 5 per cent. per annum, or as much of the same as may be earned within the year after the first-mortgage bonds have received their interest in cash, the right of foreclosure to be suspended until Sept. 1, 1886. These new bonds are to be issued in exchange for the old second-mortgage bonds and unpaid coupons. (3.) Third-mortgage 35-year bonds, bearing 5 per cent. interest, after the payment of interest on the first and second-mortgage bonds, for the conversion of existing third-mortgage bonds. (4.) Preferred stock, to receive 1 per cent. per annum, if earned within the year, after the third-mortgage bonds have received 5 per cent. in cash, to take up the present preferred stock. (5.) Common stock, to receive 1 per cent. after the payment of 1 per cent. on the preferred stock, to be exchanged for the old common stock. The surplus revenue remaining after these payments is to be applied to increasing the interest to 7 per cent. on the new mortgage bonds in succession and to 5 per cent. dividends on the new preferred stock.

The terms for the conversion of the leased lines' rental trust bonds are as follows: (1.) The leased lines' bonds of 1872 are to receive 4 per cent. for the first three years; 5 per cent. thereafter for six years, and 6 per cent. thereafter until maturity. (2.) The leased lines' bonds of 1873 are to receive the net profits up to 7 per cent. (but not less than 2 per cent. during the first two years) arising from the working of the lines whose securities are held by trustees. The amount due under the guarantee of these bonds by the Erie Company of 7 per cent. beginning Jan. 1, 1876, to be applied, when received, toward the full payment of the coupons.

In addition to the above-mentioned arrangement, the reorganization scheme provides for the issue of \$10,000,000 6 per cent. bonds, having a first lien upon the whole property of the company, in order to provide means for reducing the road to the standard gauge, for the payment or exchange of that portion of the so-called Ohio first-mortgage bond, amounting to \$2,418,300, which were due on Oct. 1, 1876, for the repayment of the amount borrowed from the leased lines of 1873, and for necessary reorganization purposes.

The Atlantic & Great Western Company, as organized, will have the following funded debt, exclusive of arrearages of interest:

Prior-lien bonds.....	\$10,000,000
First mortgage bonds.....	18,000,000
Second-mortgage bonds.....	12,000,000
Third-mortgage bonds.....	29,000,000
Leased-line bonds (two classes).....	10,000,000
Total.....	\$79,000,000

The preferred stock amounts to about \$10,000,000, and the common stock, as stated, to \$25,000,000.

Boston & Albany.—At the annual meeting in Boston, Feb. 11, President Lincoln reported that the Boston & Providence Company had withdrawn from its proposition to consolidate on equal terms, and that all negotiations between the two companies were now at an end.

Boston, Barre & Gardner.—Recently holders of first-mortgage bonds to the amount of \$64,100 made a formal request to the trustees to take possession of the road and work

it for their benefit. The trustees refused to act, on the grounds that only one-sixth of the bondholders joined in the petition, and that action would bring on a long and expensive suit.

Bridgeton & Portland.—This projected road is to run from Bridgeton, Me., southeast through Naples, Casco, Raymond, and Gray to a point on the Maine Central near Portland. It will be about 30 miles long, passing near several manufacturing villages and some large water-powers not now used. The towns on the line are to be asked for aid.

Bryan & Baltimore.—This company has been organized to build a railroad from Bryan, in Williams County, O., southeast to Delaware Bend on the Chicago Division of the Baltimore & Ohio. The distance is about 24 miles, and the capital stock is to be \$100,000.

Cairo & Euphrates Valley.—A dispatch from Boston, Feb. 10, says: "A company was organized in this city yesterday, under a charter from this state dated Feb. 6, 1880, for the purpose of constructing and operating a railroad from Cairo, Egypt, through Port Said and Damascus to connect with the Euphrates Valley Railroad, about to be built by an English company. Branch roads are also provided for by the charter. The Turkish government has been applied to for concession of the necessary right of way."

Central of Georgia.—A dispatch from Atlanta, Ga., says that reports are current there that this company has given notice of its withdrawal from the Southern Railway & Steamship Association. The reasons given are that President Wadley, at a recent meeting of the Association insisted that only trunk lines should prorata, and failing to carry his point, he refused to agree to pool the rates for the Central until he consulted his board of directors.

Central of New Jersey.—The Receiver has bought a new steamship of considerable size which is being fitted up to carry coal from the company's coal docks at Port Johnston and Elizabethport. The vessel will be run to Providence and other Eastern ports. If successful, more steamers will be added, and a fleet of steam colliers established like that of the Reading Company.

Central Vermont.—It is announced that this company is arranging a general reduction of local passenger rates over its own and connecting lines.

Chesapeake & Delaware Ship Canal.—A report of surveys lately submitted to the Secretary of War gives the following particulars as to the different routes for this proposed canal to connect Chesapeake Bay with Delaware Bay and the ocean:

Route.....	Length of canal.....	Distance, Baltimore to sea.....	Estimated cost.....
Choptank River.....	37.07	150	\$16,500,000
Choptank, second route.....	30.00	139	18,625,000
Wye River.....	42.00	128	26,500,000
Queenstown.....	53.78	107	37,250,000
Centerville.....	50.95	106	41,500,000
Southeast Creek.....	38.35	116	25,000,000
Sassafras River.....	16.20	129	8,500,000

The distance is from Baltimore to a common point at sea, 12 miles outside of Delaware Breakwater. The distance to this point by the water route now used is 325 miles. The estimates are for a canal 100 feet wide at the bottom with 26 feet depth of water everywhere at mean low tides. Tide-gates only are expected to be used, and these are estimated for 600 feet long and 60 feet wide. The Sassafras River route seems to be preferred as the easiest to build.

Chicago & Pacific.—At the annual meeting in Chicago Feb. 3, the stockholders voted to approve the action of the officers in contesting the foreclosure suit, and instructed them to continue the contest as long as possible, in order to protect the interests of stockholders and unsecured creditors.

Chicago & Paducah.—In Springfield, Ill., Jan. 28, an order was entered in the United States Circuit Court approving the agreement made between Eugene Ellery, Receiver of the Chicago & Paducah Railroad, and the Wabash, St. Louis & Pacific Company, all the parties in interest appearing by counsel and consenting thereto. The Court orders the Receiver to deliver the railroad and property to the Wabash, St. Louis & Pacific, which will be required to deliver the property when sold to the purchaser. It is expected that the Wabash Company itself will be the purchaser.

Chicago, Milwaukee & St. Paul.—It will be remembered that some time ago this company brought suit against Russell Sage, of New York, to recover certain bonds which, it was charged, he converted to his own use while Vice-President of the company. He pleaded in defense the statute of limitations and the Court dismissed the case. The company pressed the matter, however, and Mr. Sage has now settled by paying \$150,000 in satisfaction of all claims.

It is reported that this company has made arrangements to buy the Hastings & Dakota line, now leased, the consideration to be \$2,000,000 bonds secured on the road.

Chicago, Pekin & Southwestern.—Receiver Reed reports as follows for December:

Balance, Dec. 1.....	\$15,713
Receipts from all sources.....	41,984
Total.....	\$57,697
Disbursements.....	40,888
Balance, Jan. 1.....	\$16,809

The receipts exceeded the disbursements by \$1,096 for the month.

Cincinnati, Sandusky & Cleveland.—This company reports that for the four months ending Dec. 31 its net earnings were: 1879, \$99,125.53; 1878, \$58,708.77; increase, \$40,416.76, or 68.9 per cent. For December the increase in net earnings was 171.4 per cent. The increase in traffic for the same period was very large.

Cincinnati Southern.—It is now stated that the Trustees cannot accept the road as completed without further authority, and the Ohio Legislature is to be asked to pass a bill giving the necessary powers.

Colorado Central.—This company has executed a new mortgage to secure an issue of \$2,526,000 bonds to bear not more than 7 per cent. interest, and to run 30 years from July 1, 1879. These new bonds are to replace the equal amount of 8 per cent. first-mortgage bonds now outstanding, and will simply refund the present debt at a lower rate of interest.

Columbus, Chicago & Indiana Central.—The Pennsylvania Railroad Company takes an appeal from the final decree of the United States Circuit Court holding it responsible for some \$2,400,000 back rent, as guarantor of the lease of this road by the Pittsburgh, Cincinnati & St. Louis Company. The Circuit Court has allowed the appeal, and orders that the net earnings of the leased road continue to be paid into Court as heretofore until a final decision. It is said that

the Columbus, Chicago & Indiana Central Company will also take an appeal from a portion of the decree.

Cumberland, Moorefield & Petersburg.—This company has been organized to build what was formerly known as the South Branch road, on which some grading was done several years ago. It is to leave the Baltimore & Ohio at Green Spring Run, W. Va., and run up the South Branch of the Potomac through Romney and Moorefield to Petersburg, about 45 miles. It is chiefly intended to reach large deposits of valuable iron ore about Moorefield, where the Cambria Iron Company and others have lately purchased some large tracts of ore lands.

Dallas & Wichita.—Texas dispatches state that this road has been sold to parties representing the Missouri, Kansas & Texas and the Texas & Pacific. The road is to be extended to a connection with the Denison & Pacific road.

The Dallas & Wichita road is completed from Dallas, Tex., to Lewisville, 22 miles, and is graded for some distance further. No work has been done on it lately, owing to quarrels in the management.

Dubuque, Minneapolis & St. Paul.—This company has filed articles of incorporation for a railroad from St. Paul, Minn., south to the Iowa line in Mower County, about 105 miles. It is intended to connect with the Cedar Falls & Minnesota Branch of the Illinois Central, and the organization is reported to be in the interest of that company.

Eastern.—This company reports a large increase in business this year, both in through and local freights, and also in passengers. For the quarter ending Dec. 31, the first quarter of the current year, the gross earnings were \$683,590, an increase of \$85,500, or 16.2 per cent. over the same period in 1878.

Negotiations are still reported in progress between this company, the Boston & Maine and the Maine Central for a joint agreement in relation to traffic and rates.

Elizabeth, Lexington & Big Sandy.—Work is to be resumed on the extension of this road very soon. Meantime the company has let contracts for ties to be distributed along the line, and for a bridge 200 ft. long over Big Sandy River.

Flint & Pere Marquette.—This company reports an increase of \$32,581, or 42 per cent. in gross earnings for January. The earnings were larger than in any January since the road was built.

During January the Land Department sold 2,351 acres of land for \$42,045.85. Cash collections for the month were \$114,035.01. The sales were chiefly to persons who intend to settle on their land and cultivate it.

Galveston, Houston & Henderson.—It is reported that the trouble among the bondholders of this road has been settled, and that the holders of the bonds upon which interest is overdue have agreed to fund their coupons in second-mortgage bonds.

Grand Central Depot in New York.—In response to a resolution of the Connecticut Legislature, President Watrous, of the New York, New Haven & Hartford Company, has furnished a statement, from which it appears that the cost of the Grand Central Depot and its adjacent grounds in New York City was \$6,419,118.10. The New York, New Haven & Hartford Railroad Company has a perpetual lease of its part of the depot, for which it pays 33 per cent. of the interest on this cost, \$6,419,118.10, reckoned at 7 per cent. per annum. This rental amounts to \$148,281.63 per year. It is also to pay the same proportion, 33 per cent. of all taxes and assessments laid upon the property, and to contribute in like proportion toward rebuilding in case the depot should be destroyed by fire. The New York Central & Hudson River Railroad Company pays 42 per cent. of the interest and 42 per cent. of the taxes and insurance. The property belongs to the New York & Harlem Company, which, therefore, charges itself with 25 per cent. of the interest. The depot is under the control of a depot-master, who is appointed by the unanimous vote of the president of the three companies, and may be removed by the president of either of them. In case the presidents cannot agree in appointing a new depot-master, the Governor of the state of New York is to make the appointment. The percentages to be paid by the roads may be adjusted every five years, but the lease is perpetual during the charter of the company.

Indianapolis Belt.—At the annual meeting in Indianapolis last week it was reported that the company's stock-yards stood second in the United States in number of sheep handled, third in hogs and third in horses. A committee was appointed to see if a reduction in the stock-yard expenses could not be made without interfering with the efficiency of the work. It was resolved to reduce the charge for transferring cars between the roads entering Indianapolis from \$1 to 80 cents per car. The road runs around Indianapolis, connecting all the lines entering the city.

Indianapolis, Cincinnati & LaFayette.—It is said that the name of this company as reorganized will be the Cincinnati, Indianapolis, St. Louis & Chicago Railroad Company—which is long enough for two or three roads, one would think. Under the plan of reorganization issued some months ago, the new company is to have a funded debt of \$7,500,000 first consolidated 6 per cent. bonds, due in 1919, to be secured equally on the entire line of road from La Fayette to Cincinnati, with all equipments and property, and \$4,000,000 in capital stock. The following classes of bonds are to be exchanged for the new bonds at their face value.

Indianapolis & Cincinnati 7s, 1888.....	\$1,000,000
Cincinnati & Indianapolis, 1st 7s, 1892.....	490,000
Cincinnati & Indianapolis, 2d 7s, 1882-87-92.....	1,501,000
Funded coupon bonds.....	44,000
Indianapolis, Cincinnati & LaFayette 7s, 1897.....	2,800,000
Funded coupon bonds.....	70,000
Indianapolis, Cincinnati & LaFayette equipment 7s, 1883.....	362,000
Total.....	\$6,885,000
New bonds to be issued.....	7,500,000
Surplus of bonds.....	615,000

The other securities are as follows:

Indianapolis, Cincinnati & LaFayette 7s of 1899.....	\$2,087,750
Indianapolis, Cincinnati & LaFayette funded debt 7s.....	1,419,300
(In this latter is included the preferred stock.).....	
Common stock.....	5,587,150

The 7s of 1899 are to receive 70 per cent. of their face value in stock, and the funded debt 7s (or preferred stock) 40 per cent. The balance (\$615,000) of new bonds above and the remaining \$2,029,045 of stock was to be offered for three months as follows: To the 7s of 1899, 10 per cent. in bonds and 30 per cent. in stock for 10 per cent. cash; funded debt 7s, 20 per cent. bonds and 80 per cent. in stock for 10 per cent. cash; to the common stock, 2 per cent. bonds and 6 per cent. in stock for 2 per cent. cash. It is said that most of the bonds thus offered have been taken.

Indianapolis, Decatur & Springfield.—The first through passenger train over this road was sent out from In-

dianapolis, Feb. 9, and the entire road is now opened for business. As heretofore noted, it is 152 miles long, from Indianapolis west to Decatur, Ill., 51 miles having been built within the past year.

Junction & Breakwater.—An agreement has been made for the consolidation of this company, the Breakwater & Frankford and the Worcester Railroad Company. They are all owned and operated by the Old Dominion Steamship Company, and the consolidation will be merely formal and for convenience in accounts. The consolidated company will own 101 miles of road in Southern Delaware and the Eastern Shore of Maryland.

Levis & Kennebec.—For the tenth time, more or less, a fight over the possession of this Canada road is going on. In Quebec, Feb. 5, a new board of directors was chosen in the interest of the English bondholders. The old board refused to recognize the new directors or to give up the property. Legal steps are to be taken to put the old board in possession of the road.

Little Rock & Fort Smith.—This company reports an increase of 200 per cent. in its net earnings for the month of January. Its land sales also show a great increase, having been 10,352 acres for \$40,762 in January, against 1,892 acres for \$7,603 in January of last year.

Little Rock, Mississippi River & Texas.—The Western Division is now completed to Monticello, Ark., 16 miles west of Collins, the late terminus, and 41 miles from the river terminus at Arkopolis.

Lookout Mountain.—The Lookout Mountain Company of Tennessee has been consolidated with the Chattanooga, Montgomery & Pensacola Company, of Georgia, the consolidated company to be known as the Lookout Mountain Railroad Company. Neither company owns any completed road. The projected line is from Chattanooga, Tenn., south to Rome, Ga., about 60 miles. It is said that arrangements have been made to begin work very soon.

Louisville & Nashville.—This company is now offering, through Drexel, Morgan & Co., of New York, a new issue of bonds, secured by first mortgage on the Evansville, Henderson & Nashville Division, formerly the Nashville Division of the St. Louis & Southeastern. The bonds bear 6 per cent. interest, have 40 years to run, and are offered at 102½ and accrued interest. The bonds are at the rate of \$17,500 per mile, but only \$1,600,000 are now offered for sale, the \$800,000 representing that portion of the road which is in Tennessee being held in trust until the claim of the Tennessee state bondholders to a prior lien is disposed of by the courts.

Macon & Brunswick.—A report comes from Atlanta that the lessees of this road have transferred the lease awarded them at the recent letting by the state of Georgia to a New York company, the head of which is Mr. R. T. Wilson, President of the East Tennessee, Virginia & Georgia Company. It is said that the extension from Macon to Atlanta will be built at once.

Maine Central.—This company's business for last year shows a great improvement over 1878. It is stated that the net surplus for 1879 was over \$100,000, after paying all interest, rentals and other charges.

Metropolitan Elevated.—It is announced that \$6,000,000 first-mortgage bonds of this company, issued to pay for its new Second Avenue line in New York, have been sold to a syndicate represented by Drexel, Morgan & Co., of New York. The price is not given out, but is said to be very near par.

Minneapolis & Northwestern.—This company has let the contract for building the section of its projected road from Minneapolis, Minn., to Hutchinson, 61 miles, to Rosser, Brackett & Co. They are to do all the work and furnish everything but ties and rails, which the company is to supply. The road is to be open to Hutchinson by Nov. 1, 1880. The company has already secured depot grounds in Minneapolis.

Montpellier & Wells River.—The Boston Advertiser says: "This company is now paying a dividend of 2 per cent. to the stockholders, who have converted their bonds into stock. The capital of the road is \$800,000. The road is about 40 miles long, and connects with the Central Vermont at Montpellier, and with the Boston, Concord & Montreal and the Connecticut & Passumpsic at Wells River. The road has now no mortgage or floating debt, and is managed with great economy. The President, Mr. Sortwell, who owns more than half the stock, charging nothing for his services. The rolling stock was purchased by Mr. Sortwell, and the road pays 6 per cent. interest on its cost. The surplus earnings of the road are taken to reduce this account, however, and up to the present time it has been reduced to \$50,000. The road is in excellent condition, and earnings are increasing."

Morris & Eastern.—This company is organized to build a railroad about 25 miles long from Morris, Ill., eastward to a connection with the projected Joliet & Valparaiso road.

Morristown Branch.—It is proposed to build a branch about eight miles long from Morristown, O., to Lewis' Mills, on the Central Ohio Division of the Baltimore & Ohio. The people interested in the road are trying to get some aid from the Baltimore & Ohio.

Nevada Central.—The track of this road on Feb. 11 reached Austin, Nev., 90 miles southward from the junction with the Central Pacific at Battle Mountain. Austin is the centre of a considerable mining region and will be the terminus of the road for the present.

New Jersey Midland.—A new or compromise plan of reorganization has been proposed, and an attempt is now being made to secure its adoption by all parties interested, with a view to early foreclosure. Under its provisions the first mortgage bondholders are to receive principal and interest in bonds of the new company, which are to bear interest at 6 per cent. per annum, this to be cumulative, and they are also to be entitled to votes in proportion to their holdings for members of the directory. The second-mortgage bondholders are to receive principal and interest in new income bonds, bearing interest at 6 per cent. per annum, but not to be cumulative. The third-mortgage bondholders and creditors under the floating debt are to receive principal and interest in preferred stock, bearing 6 per cent. interest, but not cumulative. The holders of common stock are to receive new common stock in exchange. The holders of labor claims are to receive 50 per cent. in cash and the remainder in preferred stock. The holders of the chattel mortgages are to be treated the same as the first-mortgage bondholders. The stockholders of the Hudson Connecting Line are to have their choice of faring the same as the first-mortgage bondholders, or may take instead 40 per cent. of their holdings in new first-mortgage bonds and the balance in preferred stock, with the privilege of participating in the benefits of the judgment of the New York & Oswego Midland Company, as obtained in the degree on Van Houton's ap-

peal. All the legal expenses are to be paid out of the issue of new first-mortgage bonds.

This plan recognizes all the junior securities which, under previous plans, were ignored. The last report issued gives the capital stock at \$1,423,475.18; the first-mortgage bonds at \$3,000,000; the second-mortgage bonds at \$1,500,000; the third-mortgage bonds at \$1,000,000, and the floating debt, claims, etc., at \$989,924.

New London Northern.—At the annual meeting in New London, Feb. 5, the stockholders voted to ratify and confirm the agreement for the purchase of the Brattleboro Branch of the Vermont & Massachusetts road. Also to issue \$1,500,000 new bonds, \$700,000 to be used to pay for the branch, and the remainder to pay off old bonds, which will mature soon.

New Orleans & Mobile.—It is stated that an agreement has been concluded for the sale of this road to the Louisville & Nashville Company for \$4,000,000 in 6 per cent. bonds. The road extends from New Orleans to Mobile, 141 miles, and is the Eastern Division of the old New Orleans, Mobile & Texas road. It has been operated by trustees for the bondholders for nearly six years past. It is said that the trustees will at once proceed to complete the foreclosure suit and have the road sold.

New York & New England.—This company's statement for the months of October and November is as follows:

	1879.	1878.	Increase.	P. c.
Gross earnings.....	\$374,212.50	\$320,079.61	\$54,132.89	16.9
Expenses.....	206,607.94	245,654.79	20,963.15	8.5
Net earnings.....	\$167,604.56	\$74,424.82	\$93,179.74	44.6

The mileage was the same in both years, showing a very fair increase in business this year.

New York & Oswego Midland.—The latest report is that a construction company has been formed which is to put the road in good order and build a western extension to connect with the Atlantic & Great Western road. This company, it is said, will control the road and will also buy in the New Jersey Midland road and make it part of the line.

New York Central & Hudson River.—The earnings of this company for the first four months of the current fiscal year, are published as follows:

	1879-80.	1878-79.	Increase.
October.....	\$2,898,886.10	\$2,771,203.61	\$127,682.58
November.....	2,801,835.04	2,567,318.47	234,516.57
December.....	2,846,216.37	2,287,265.30	558,951.07
January.....	2,593,612.75	2,024,811.99	568,800.76
Total.....	\$11,140,550.36	\$9,650,599.37	\$1,489,950.98

The statement shows a very large increase. The report is "semi-official" only.

Ohio & Mississippi.—The New York Herald of Feb. 10 says: "The Ohio & Mississippi Railway has filed an answer to the Dimpfel suit, offering to restore the Springfield Division on an equitable accounting of the earnings and operating expenses and the money expended on the road. With the adjustment of this matter the company could be reorganized."

Pacific Railroads and the Government.—A bill has been reported to the House of Representatives from the Committee on Pacific Railroads to create a sinking fund for the Kansas Pacific, Sioux City & Pacific and the Central Branch, Union Pacific railroad companies. It recites among other things that the United States, in view of the indebtedness and operations of the above-named companies and of the disposition of their respective incomes, is not and can not, without further legislation, be secure in its interests in and concerning said railroads and companies. The bill amply extends the general provisions of the Thurman act of May, 1878, as modified by a bill now pending in the House to the three additional subsidised roads mentioned in the title. It also provides that these three companies shall on the 1st day of April and October in each year pay into the treasury, to the credit of the sinking fund, the following amounts, viz: The Kansas Pacific, \$150,000; the Sioux City & Pacific, \$30,000, and the Central Branch, Union Pacific, \$30,000.

Pennsylvania & Delaware.—This road was bought at the foreclosure sale by Dell Noblitt, of Philadelphia, who has since, it is understood, sold out a share in his purchase to the Pennsylvania Railroad Company. Last week a meeting of the owners was held, at which the Pomeroy & State Line Company was organized, and the capital stock fixed at \$500,000. This organization covers only the 19 miles of the road in Pennsylvania, and another will have to be made in Delaware, for the 20 miles in that State.

Pensacola.—It is stated that the sale of this road to the Louisville & Nashville will not interfere with the building of the extension to Selma. Work is progressing steadily on the gap between Pollard and Pineapple. A large part of the new road will run through valuable timber which can be used to supply the Pensacola mills and lumber ships.

Arrangements have been made to run through trains to Pensacola from Montgomery, and a steamship line is to be established between Pensacola and Havana, which will run in connection with through express trains so as to make close connection to Baltimore and New York.

Petersburg.—The bridge over the Meherrin River, near Hicksford, Va., was burned up on the night of Feb. 9. It was a wooden truss bridge, covered, 200 ft. long and was built in 1806, when it cost \$8,000. A temporary trestle will be up by the end of the week so that trains can run regularly.

Philadelphia & Atlantic City.—The trial of Elwood Johnson, engineer, and John Ewing, Conductor, for manslaughter in causing the accident to a train some months ago, by which several persons were hurt, was in progress in the Camden (N. J.) County Court last week. The jury acquitted Ewing and failed to agree in the case of Johnson. Assistant Superintendent Verts is now on trial.

Portland & Ogdensburg, Vermont Division.—It is announced that the bondholders have organized a new corporation by the name of the St. Johnsbury & Lake Champlain Railroad Company, to take and own the road when the foreclosure suit is finished.

Notice is given that all holders of first-mortgage and joint preference bonds will have the right to come in and join in the new organization, provided they do so within 30 days.

Rochester & State Line.—In the New York Supreme Court at Rochester, Feb. 9, the Union Trust Company, trustee, filed notice of its *pendens* against this company, in consequence of default made in the January interest on the \$2,575,000 first-mortgage bonds. This notice is intended to secure the prior claim of the bondholders, and whether any further action is taken in the suit probably depends on the ability of the local stockholders, who are represented by the present management, to make terms with Mr. Vanderbilt, who is the chief owner of the stock.

St. Joseph & Western.—The stockholders have voted

